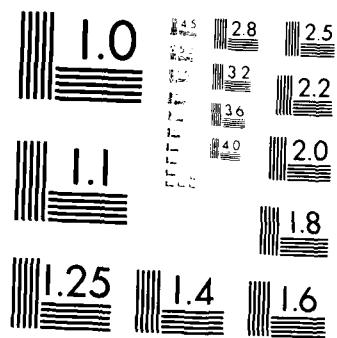


AD-A152 270 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER  
PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1  
UNCLASSIFIED N00019-81-C-0395 F/G 9/2 1/8 NL

**UNCLASSIFIED** ~~BETAPAGE NY J-3 SHEDFIELD FEB 83 HDCK-83-1-1~~ **F7G 9/2** **NL**  
~~N00819-81-C-0395~~



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1954

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AD-A152 270

REPORT NO. ADCR-85-1  
Volume III, Part 1 of 2

**ESP — A PILOT COMPUTER PROGRAM FOR  
DETERMINING FLUTTER-CRITICAL  
EXTERNAL-STORE CONFIGURATIONS**

**VOLUME III — PROGRAM COMPIRATION  
PART 1 OF 2**

February 1985

Prepared Under Contracts N00019-81-C-0395  
and N00019-84-C-0123

JOHN B. SMEDFJELD

GRUMMAN AEROSPACE CORPORATION  
BETHPAGE, NEW YORK 11714



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Report No. ADCR-85-1  
Volume III, Part 1 of 2

**ESP - A PILOT COMPUTER FOR DETERMINING  
FLUTTER-CRITICAL EXTERNAL-STORE CONFIGURATIONS**

**Volume III - Program Compilation  
Part 1 of 2**

**John B. Smedfjeld**

**February 1985**

**Prepared under Contracts N00019-81-C-0395  
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**by**

**GRUMMAN AEROSPACE CORPORATION  
Bethpage, New York 11714**

**for**

**NAVAL AIR SYSTEMS COMMAND  
Washington, D.C. 20361**



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## FOREWORD

This report was prepared for the Naval Air Systems Command, Washington, D.C., under contracts N00019-81-C-0395 and N00019-84-C-0123, "Computer Code for Flutter-Critical External-Store Configurations". Funding was provided via Dr. Daniel Mulville, AIR-310B. The contract technical monitor was Mr. George Maggos, AIR-5302C.

The report consists of three volumes. Volume I, entitled "User's Manual", provides instructions for using the ESP program and presents descriptions of typical output. Volume II, "Final Report on Program Enhancement and Delivery", describes the work that was performed under the two contracts. A listing from a CDC compilation of the program is contained in Volume III, "Program Compilation".

The contributions of many individuals to the successful completion of the contracts are gratefully acknowledged. Ms. Ann Marie Novak performed much of the work required to convert the original IBM code to a CDC version. Highly valuable consulting support was provided by Mr. Richard Chipman, the primary developer of the original ESP version, and by Mr. Dino George and Dr. Joel Markowitz, key developers of FASTOP. Assistance on computing problems was provided by several persons at Grumman, including (in alphabetical order) Mr. Charles Bores, Mrs. Linda Ehlinger, Mr. Joel Halpert, Mr. Luke Kraner, Mr. Donald MacKenzie, Mr. Mario Mistretta, Mr. John Ortgiesen, Ms. Florence Wimpfheimer, and Mrs. Noreen Wolt. Key contributions to making the ESP program operational on the NADC Central Computing System were made by Messrs. Robert Richey and Howard Ireland of the Naval Air Development Center. Finally, Mr. Louis Mitchell of the Naval Air Systems Command provided valuable insight into program features which would be important to practicing flutter analysts, and also provided helpful suggestions during the preparation of this report.

## CONTENTS

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5 COMPILE LISTING . . . . .	5-1
6 REFERENCES . . . . .	6-1

**A-100**      **For**  
1. P. I.      **X**  
2. P. C.      **X**  
3. P. D.      **X**  
4. P. S.      **X**  
  
**Pv.**  
**Distribution/**  
  
**Availability Codes**  
**Avail and/or**  
**Dist      Special**  
  
**A-1**

## 1 - SUMMARY

A pilot computer program for determining flutter-critical external-store configurations has been developed and made operational on the Naval Air Development Center Central Computer System. The new program, designated ESP (External-Stores Program), is a derivative of the previously developed Flutter And STrength Optimization Program (FASTOP).

A compilation of the 264 subroutines in ESP is contained herein. The program consists of three major modules: (1) a vibration-analysis module, which begins with subroutine AVAM; (2) a flutter-analysis module, which begins with subroutine AFAM; and (3) a search module (called the flutter-optimization module in FASTOP), which begins with subroutine AFOM. These modules are entered via subroutine FOP, which performs most of the functions of a main program in the FASTOP and ESP Flutter Optimization Package. The actual MAIN program, which calls the FOP subroutine, is designated FASTOP herein.

To facilitate locating the compile for a particular routine, two numbered lists of all subroutine names have been provided. The first list, which is in order of appearance in the compile, determines the subroutine numbers. The second list is alphabetical. Part 1 of this volume contains the first 119 subroutines, and Part 2 contains the remainder.

*Supplemental to the included programs, To turn.*

## 2 - INTRODUCTION

During the development of the initial version of the Flutter And Strength Optimization Program (FASTOP), Reference 1, under contract F33615-72-C-1101 from the Air Force Flight Dynamics Laboratory, Mr. Keith Wilkinson, the project engineer on that contract, recognized that much of the technology being used for minimum-weight structural resizing in FASTOP also had the potential for substantially reducing the time and cost required to determine which combinations of wing-mounted external stores would result in the lowest aircraft flutter speeds.

Subsequently, under contract N00019-76-C-0160 from the Naval Air Systems Command, as well as a complementary Grumman Independent Research and Development project, a search algorithm for wing/store flutter was developed, refined, and tested by modifying and expanding the FASTOP code (see References 2 and 3). When this development effort led to a pilot program that exhibited both good reliability (absence of search failure) and good convergence characteristics, work was continued under a second NASC contract, N00019-79-C-0062, to add features desirable for practical applications and to demonstrate the new External-Stores Program (ESP) on a representative attack aircraft and its associated store inventory (see Reference 4). The project engineer on these studies was Mr. Richard Chipman.

With the performance and the advantages of the store search procedure having been confirmed, early utilization of the procedure on current aircraft projects became desirable. Toward this end, the program was further enhanced as described in Volume II of this report, and a user's manual, Volume I, was written. Also, the program was made operational on the Central Computer System at the Naval Air Development Center. A compilation of this latest version of the program is contained in this volume, Volume III.

3 - LIST OF SUBROUTINES NAMES IN ORDER OF APPEARANCE IN COMPILE

1 - FASTOF	2 - TFASTO	3 - FOP	4 - TFOP
5 - LDR	6 - ENDF	7 - DTABLE	8 - SETUP
9 - LTABLE	10 - LLABEL	11 - FSIOFO	12 - DSIOFO
13 - PTABLE	14 - PLABEL	15 - GEDLAB	16 - PUDLAB
17 - FSIO	18 - DSIO	19 - TSIO	20 - FCLOSE
21 - MESSAGE	22 - TIMEB	23 - PROGNA	24 - PRMAT1
25 - PRMAT2	26 - SCAPRO	27 - DSQRTF	28 - DCMPLF
29 - CDABSF	30 - RDM	31 - AVAM	32 - TAVAM
33 - READY	34 - DYNMAS	35 - MASTOR	36 - FFMASS
37 - IV33	38 - BSOLVE	39 - MSG02	40 - QFACT
41 - QCHOL	42 - HOTDOT	43 - TRAN	44 - QFSOL
45 - QFOR	46 - QPASS	47 - REVERS	48 - QBSOL
49 - QBAC	50 - UNFIL	51 - MULT	52 - ENMMFY
53 - VIBIFO	54 - COMPAK	55 - EIGEN	56 - READMA
57 - RITVEC	58 - SYMEIG	59 - TFORM	60 - STURM
61 - PREP	62 - QSVEC	63 - SWAP	64 - DOTPRO
65 - ANDOR	66 - TRIEQ	67 - FUTILE	68 - DAGGER
69 - VIBRAF	70 - MMULT	71 - MCMULT	72 - ARAYMX
73 - ARAYMN	74 - MAX	75 - CLCORD	76 - FERGCV
77 - AFAM	78 - TAFAM	79 - RNRW	80 - CNRW
81 - DSCAPR	82 - COMSCA	83 - POOL	84 - FLINFO
85 - MOVIS	86 - HELGX	87 - FORM	88 - HELGA
89 - PICTUR	90 - AORDER	91 - SCLMAX	92 - ROUND
93 - SCLINC	94 - FATAN	95 - RODDEN	96 - PART1
97 - ATAN3	98 - MIDI	99 - MODAL	100 - HELP
101 - BIDI	102 - BEIN	103 - SPLIT3	104 - TRIDI
105 - MERGE	106 - GLOBAL	107 - GENQ	108 - AUGW
109 - TKER	110 - PRT2	111 - INCRO	112 - KERNEL
113 - IDF1	114 - IDF2	115 - SNPDF	116 - QUAS
117 - FUTSOL	118 - GENF	119 - MACH	120 - EVOVLE
121 - TANL	122 - TANT	123 - NOXN	124 - PLAN
125 - HELZ	126 - MODAZ	127 - ORDS	128 - DSPMD
129 - COFFIN	130 - NORDER	131 - RIF	132 - TRIF
133 - DSPDDW	134 - IMAGE	135 - KERN	136 - GEOM

137 - WHSA	138 - XTEXLE	139 - INTP	140 - FORK
141 - INVK	142 - CONB	143 - QUADX	144 - QUAXA
145 - QUAYB	146 - CONA	147 - SPCLA	148 - PARAM1
149 - GRS	150 - CLSQ	151 - UNIFAC	152 - DUPER
153 - SUPERF	154 - UNISLV	155 - PRESS	156 - SOLFLT
157 - QFLIN	158 - FLOP	159 - ZANLYN	160 - F
161 - CDET	162 - UERTST	163 - RTIN	164 - ASSESS
165 - FRORD	166 - VECP	167 - GENEIG	168 - JORCOM
169 - ORIENT	170 - ADIV	171 - COAT	172 - CLUSAL
173 - GCVEC	174 - GRVEC	175 - CLUTSL	176 - EIGM
177 - CONV	178 - SREVNC	179 - FLSL	180 - BUCK
181 - FLASH	182 - VALCOM	183 - CQR	184 - VALROM
185 - CLR	186 - COMVEC	187 - GGCHK	188 - CLINEQ
189 - TRFR	190 - PRPLT	191 - FLUTAP	192 - VGPT
193 - AXFL	194 - AXIS	195 - TIPL	196 - AFOM
197 - TAFOM	198 - DRVTV	199 - DRUSTR	200 - FLTDES
201 - PACK	202 - UNPACK	203 - PUTROW	204 - GETROW
205 - CLUES	206 - PLB	207 - WORDS	208 - ERROR
209 - DVALUE	210 - IVALUE	211 - EOF01	212 - RWBT
213 - TITLES	214 - TIMEA	215 - PROGN	216 - HEAD
217 - DOPEN	218 - FETS	219 - DWRITE	220 - DREAD
221 - DFIND	222 - DCLOSE	223 - UCHECK	224 - MYIO
225 - MMOVE	226 - DVOLNO	227 - ABDUMP	228 - STRDES
229 - RILL	230 - VSCALE	231 - MURT	232 - USTEP
233 - CONSTR	234 - LINESR	235 - SOSCAP	236 - INCONs
237 - SERS	238 - MERS	239 - RECONS	240 - SETJGL
241 - LMKP1	242 - ADDCON	243 - LAGMUL	244 - HYPER
245 - LDFFIX	246 - DELCON	247 - GRAFRO	248 - INSECT
249 - INV	250 - SOQUAS	251 - SOFUT	252 - TRFOSE
253 - DYNSTF	254 - TRIXY	255 - UPDATE	256 - CHANGE
257 - MOVE	258 - WDCHAR	259 - REDMOD	260 - REIVEC
261 - NRM2	262 - SREVNI	263 - QINTF	264 - NASTRD

4 - ALPHABETICAL LIST OF SUBROUTINE NAMES

ABDUMP - 227	ADDCON - 242	ADIV - 170	AFAM - 77
AFOM - 196	ANBOR - 65	AORDER - 90	ARAYMN - 73
ARAYMX - 72	ASSESS - 164	ATAN3 - 97	AUGW - 108
AVAM - 31	AXIS - 194	AXPL - 193	BEIN - 102
BIDI - 101	BSOLVE - 38	BUCK - 180	CIABSF - 29
CDAT - 171	CDET - 161	CHANGE - 256	CLCORD - 75
CLINEQ - 188	CLR - 185	CLSQ - 150	CLUES - 205
CLUSAL - 172	CLUTSL - 175	CNRW - 80	COFFIN - 129
COMPAC - 54	COMSCA - 82	COMVEC - 186	CONA - 146
CONB - 142	CONSTR - 233	CONV - 177	CQR - 183
DAGGER - 68	DCLOSE - 222	DCMPLF - 28	DELCON - 246
DFIND - 221	DOPEN - 217	DOTPRO - 64	DREAM - 220
DRVSTR - 199	DRVTV - 198	DSCAPR - 81	DSIO - 18
DSIOFO - 12	DSPIOW - 133	DSFMD - 128	DSQRTF - 27
ITABLE - 7	IUPER - 152	DVALUE - 209	DVOLNO - 226
IWRITE - 219	DYNMAS - 34	DYNSTF - 253	EIGEN - 55
EIGM - 176	ENDP - 6	ENMMPY - 52	EOF01 - 211
ERROR - 208	EVOLVLE - 120	F - 160	FASTOF - 1
FATAN - 94	FCLOSE - 20	FERGCV - 76	FETS - 218
FFMASS - 36	FLASH - 181	FLINFO - 84	FLOP - 156
FLSL - 179	FLTDES - 200	FLUTAF - 191	FOP - 3
FORK - 140	FORM - 87	FRORD - 165	FSIO - 17
FSIOFO - 11	FUTILE - 67	FUTSOL - 117	GCVEC - 173
GEDLAB - 15	GENEIG - 167	GENF - 118	GENQ - 107
GEOM - 136	GETROW - 204	GGCHK - 187	GLOBAL - 106
GRAFRO - 247	GRS - 149	GRVEC - 174	HEAD - 216
HELGA - 88	HELGX - 86	HELP - 100	HELZ - 125
HOTDOT - 42	HYPER - 244	IDF1 - 113	IDF2 - 114
IMAGE - 134	INCONS - 236	INCRO - 111	INSECT - 248
INTP - 139	INV - 249	INVK - 141	IV33 - 37
IVALUE - 210	JORCOM - 168	KERN - 135	KERNEL - 112
LAGMUL - 243	LDB - 5	LDFIX - 245	LINESR - 234
LLABEL - 10	LMKF1 - 241	LTABLE - 9	MACH - 119
MASTOR - 35	MAX - 74	MCMULT - 71	MERGE - 105

MERS	- 238	MESSAGE	- 21	MIDI	- 98	MMOVE	- 225
MMULT	- 70	MODAL	- 99	MODAZ	- 126	MOVE	- 257
MOVIS	- 85	MSG02	- 39	MULT	- 51	MURT	- 231
MYIO	- 224	NASTRD	- 264	NORDER	- 130	NOXN	- 123
NRM2	- 261	ORDS	- 127	ORIENT	- 169	PACK	- 201
PARAM1	- 148	PART1	- 96	PICTUR	- 89	PLABEL	- 14
PLAN	- 124	PLB	- 206	POOL	- 83	PREP	- 61
PRESS	- 155	PRMAT1	- 24	PRMAT2	- 25	PROGN	- 215
PROGNA	- 23	PRFLT	- 190	PRT2	- 110	PTABLE	- 13
PUDLAB	- 16	PUTROW	- 203	QBAC	- 49	QBSOL	- 48
QCCHOL	- 41	QFACT	- 40	QFLIN	- 157	QFOR	- 45
QFSOL	- 44	QINTP	- 263	QPASS	- 46	QSVEC	- 62
QUADX	- 143	QUAS	- 116	QUAXA	- 144	QUAYB	- 145
RDM	- 30	READMA	- 56	READY	- 33	RECONS	- 239
REDMOD	- 259	REDVEC	- 260	REVERS	- 47	RILL	- 229
RIF	- 131	RITVEC	- 57	RNRW	- 79	RODDEN	- 95
ROUND	- 92	RTIN	- 163	RWBT	- 212	SCAPRO	- 26
SCLIMC	- 93	SCLMAX	- 91	SERS	- 237	SETJGL	- 240
SETUP	- 8	SNPDF	- 115	SOFUT	- 251	SOLFLT	- 156
SOQUAS	- 250	SOSCAP	- 235	SPCLA	- 147	SPLIT3	- 103
SREVNC	- 178	SREVNI	- 262	STRDES	- 228	STURM	- 60
SUPERF	- 153	SWAP	- 63	SYMEIG	- 58	TAFAM	- 78
TAFOM	- 197	TANL	- 121	TANT	- 122	TAUAM	- 32
TFASTO	- 2	TFOP	- 4	TFORM	- 59	TIMEA	- 214
TIMEB	- 22	TIPL	- 195	TITLES	- 213	TKER	- 109
TRAN	- 43	TRFR	- 189	TRIDI	- 104	TRIEQ	- 66
TRIP	- 132	TRIXY	- 254	TRPOSE	- 252	TSIO	- 19
UCHECK	- 223	UERTST	- 162	UNFIL	- 50	UNIFAC	- 151
UNISLV	- 154	UNPACK	- 202	UPDATE	- 255	USTEP	- 232
VALCOM	- 182	VALROM	- 184	VECF	- 166	VGFT	- 192
VIBIFO	- 53	VIBRAP	- 69	VSCALE	- 230	WDCHAR	- 258
WHSA	- 137	WORDS	- 207	XTEXLE	- 138	ZANLYN	- 159

5 - COMPILE LISTING

A listing from a compile of all ESP subroutines on the Central Computer System at the Naval Air Development Center begins on the following page.

OPT = 1

85, 01/23 08 10.44

PAGE

```

2      3      4      5      6      7      8      9      10     11     12     13     14     15     16     17     18     19     20     21     22     23     24     25     26     27     28     29     30     31     32     33     34     35     36     37     38     39     40     41     42     43     44     45     46     47     48     49     50     51     52     53     54     55

1      C      BEGINNING OF STATEMENTS ASSOCIATED WITH THE VARIOUS PROGRAMS
2      C      PROGRAM MAIN(INPUT,OUTPUT,TAPE16,TAPE17,TAPE18,TAPE19,TAPE20,TAPE21,TAPE22,TAPE23,TAPE24,TAPE25,TAPE26,TAPE27,TAPE28,TAPE29,TAPE30,TAPE31,TAPE32,TAPE33,TAPE34,TAPE35,TAPE36,TAPE37,TAPE38,TAPE39,TAPE40,TAPE41,TAPE42,TAPE43,TAPE44,TAPE45,TAPE46,TAPE47,TAPE48,TAPE49,TAPE50,TAPE51,TAPE52,TAPE53,TAPE54,TAPE55,TAPE56,TAPE57,TAPE58,TAPE59,TAPE60,TAPE61)
3      C      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
4      C      C45700 PROG FASTOP (FLUTTER AND STRUCTURAL OPTIMIZATION PROGRAM)
5      C      PROGRAM FASTOP
6      C      C* ****
7      C      C* ****
8      C      C* ****
9      C      C* ****
10     C      C* ****
11     C      C* ****
12     C      C* ****
13     C      C* ****
14     C      C* ****
15     C      C* ****
16     C      C* ****
17     C      C* ****
18     C      C* ****
19     C      C* ****
20     C      C* ****
21     C      C* ****
22     C      C* ****
23     C      C* ****
24     C      C* ****
25     C      C* ****
26     C      C* ****
27     C      C* ****
28     C      C* ****
29     C      C* ****
30     C      C* ****
31     C      C* ****
32     C      C* ****
33     C      C* ****
34     C      C* ****
35     C      C* ****
36     C      C* ****
37     C      C* ****
38     C      C* ****
39     C      C* ****
40     C      C* ****
41     C      C* ****
42     C      C* ****
43     C      C* ****
44     C      C* ****
45     C      C* ****
46     C      C* ****
47     C      C* ****
48     C      C* ****
49     C      C* ****
50     C      C* ****
51     C      C* ****
52     C      C* ****
53     C      C* ****
54     C      C* ****
55     C      C* ****

```

```

400      * 37X          TFASTO 401
        P 13H PPP          TFASTO 402
        * 3A 1H*          TFASTO 403
        * 5X 1H* 2X          TFASTO 404
        * 5X 15H          TFASTO 405
        * 37X          TFASTO 406
        P 13H PPP          TFASTO 407
        * 3X 1H*          TFASTO 408
210 FORMAT (          TFASTO 409
        * 5X 1H* 2X          TFASTO 410
        * 37X          TFASTO 411
        * 24X          TFASTO 412
        * 37X          TFASTO 413
        P 13H PPP          TFASTO 414
        * 3X 1H*          TFASTO 415
        * / 5X 1H* 2X          TFASTO 416
        * 24X          TFASTO 417
        * 37X          TFASTO 418
        P 13H PPP          TFASTO 419
        * 3X 1H*          TFASTO 420
        * / 5X 1H* 2X          TFASTO 421
        * 24X          TFASTO 422
        * 37X          TFASTO 423
        P 13H PPP          TFASTO 424
        * 3X 1H*          TFASTO 425
215 FORMAT (5X,1H*,120X,1H*,/, 5X,122(1H*))          TFASTO 426
        C          RETURN          TFASTO 427
        END          TFASTO 428
                                         TFASTO 429

```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
1 TFASTO	14	427

VARIABLES	SN	TYPE	RELATION	REFS
0 AFFDL		REAL	ARRAY	16
2 ITAPEP		INTEGER	CAFFDL COMRW <sub>P</sub>	18
0 ITAPER		INTEGER	COMRW <sub>P</sub>	18
7 ITAPET		INTEGER	CTABLE	21
1 ITAPEW		INTEGER	COMRW <sub>P</sub>	18
			I/O REFS	53
			REFS	54
			REFS	55
			REFS	56
			REFS	57
7 KPAGE		INTEGER	CLIST	19
4 KLABEL		INTEGER	CLIST	19
0 KOUNT		INTEGER	REFS	19
11 KOUNTH		INTEGER	CLIST	19
1 KPAGE		INTEGER	CLIST	19
0 KTABLE		INTEGER	CTABLE	21
5 KTABLO		INTEGER	REFS	21
5 KPAGE		INTEGER	CLIST	19
2 LINES		INTEGER	CLIST	19

SUBROUTINE	TFASTO	74/74	OPT+1	FTN 4 8+577	85/01/23	08 10.44	PAGE
5				* ,24X.	40H	GGGGGGGGGGGGGGGGGGGGGG	344
				* ,17X		, 1X	TFASTO
	0,13H	000		000			TFASTO
	* ,7X						TFASTO
	P,13H	PPP		PPP			TFASTO
	* ,3X,	1H*					TFASTO
	* ,/ ,	5X, 1H*, 2X					TFASTO
	* ,24X,			GGGGGGGGGGGGGGGGGGGG			TFASTO
	* ,17X			, 1X			TFASTO
0	0,13H	000		000			TFASTO
	* ,7X						TFASTO
	P,13H	PPPPPPPPP					TFASTO
	* ,3X,	1H*)					TFASTO
	195	FORMAT (					TFASTO
	* ,5X,	1H*, 2X					TFASTO
	* ,5X,	15H,					TFASTO
	* ,17X			,4X			TFASTO
				GGGGGGGGGGGGGGGGGG			TFASTO
	0,13H	000					TFASTO
	* ,7X						TFASTO
	P,13H	PPPPPPPPP					TFASTO
	* ,3X,	1H*					TFASTO
	* ,/ ,	5X, 1H*, 2X					TFASTO
	* ,5X,	15H,		,4X			TFASTO
	* ,17X			GGGGGGGGGGGGGGGG			TFASTO
0	0,13H	0000		0000			TFASTO
	* ,7X						TFASTO
	P,13H	PPP					TFASTO
	* ,3X,	1H*)					TFASTO
	200	FORMAT (					TFASTO
	* ,5X,	1H*, 2X					TFASTO
	* ,5X,	15H,					TFASTO
	* ,17X			,4X			TFASTO
	0,13H	000000000					TFASTO
	* ,7X						TFASTO
	P,13H	PPP					TFASTO
	* ,3X,	1H*					TFASTO
	* ,/ ,	5X, 1H*, 2X					TFASTO
	* ,5X,	15H,		AEROSPACE			TFASTO
	* ,17X			,4X			TFASTO
	0,13H	000000000		GGGGGGGGGGGGGG			TFASTO
	* ,7X			, 1X			TFASTO
	P,13H	PPP					TFASTO
	* ,3X,	1H*)					TFASTO
	205	FORMAT (					TFASTO
	* ,5X,	1H*, 2X					TFASTO
	* ,5X,	15H,		CORPORATION			TFASTO
	* ,17X			,4X			TFASTO
	0,13H	00000000		GGGGGGGGGGGG			TFASTO
	* ,7X			, 1X			TFASTO
	P,13H	PPP					TFASTO
	* ,3X,	1H*					TFASTO
	* ,/ ,	5X, 1H*, 2X					TFASTO
	* ,5X,	15H,					TFASTO
	* ,37X						TFASTO
	P,13H	PPP					TFASTO
	* ,3X,	1H*)					TFASTO
	* ,/ ,	5X, 1H*, 2X					TFASTO
	* ,5X,	15H,					TFASTO
	* ,37X						TFASTO

```

S,13H      SSSSSSS
*,.7X
T,13H      TTT
*,.7X
0,13H000   000
290

P,13HPPPPPPPPP
*,.3X, 1H*)
175 FORMAT (
*,.7X, 5X, 1H*, 64X
T,13H      TTT
*,.7X
0,13H000   000
*,.7X
P,13H PPP   PPPP
*,.3X, 1H*
*./, 5X, 1H*, 64X
T,13H      TTT
*,.7X
0,13H000   000
*,.7X
P,13H PPP   PPP
*,.3X, 1H*)
180 FORMAT (
*,.7X, 5X, 1H*, 64X
T,13H      TTT
*,.7X
0,13H000   000
*,.7X
P,13H PPP   PPP
*,.3X, 1H*
*./, 5X, 1H*, 64X
T,13H      TTT
*,.7X
0,13H000   000
*,.7X
P,13H PPP   PPP
*,.3X, 1H*)
185 FORMAT (
*,.7X, 5X, 1H*, 2X
*,.8(3HGGG), 38HGGGGGG
T,13HGG   TTT
*,.7X
0,13H000   000
*,.7X
P,13H PPP   PPP
*,.3X, 1H*
*./, 5X, 1H*, 2X
*,.8(3HGGG), 38HGGGGGG
T,13H      TTT
*,.7X
0,13H000   000
*,.7X
P,13H PPP   PPP
*,.3X, 1H*)
190 FORMAT (
*,.7X, 5X, 1H*)

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SUBROUTINE TFASTO 74/74 QPT=1

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* .7X           SSS          230
* .13H          TTT          231
* .7X           TTT          232
T.13H          TTT          233
* .7X           00000000  234
0.13H          00000000  235
* .23X,        1H*         236
* ./, 5X, 1H*, 24X
A,13HAAA      AAA          237
* .7X           AAA          238
* .13H          SSS          239
S.13H          SSS          240
* .7X           TTT          241
T.13H          TTT          242
* .7X           TTT          243
* .13H          000000000  244
0.13H          000000000  245
* .23X,        1H*         246
* ./, 5X, 1H*, 44X
160 FORMAT(   247
* .7X           5X, 1H*, 44X
S.13H          SSS          248
S.13H          SS           249
* .7X           SS           250
T.13H          TTT          251
* .7X           TTT          252
0.13H          0000          253
* .23X,        1H*         254
* ./, 5X, 1H*, 44X
S.13HSSS      SSS          255
* .7X           SSS          256
T.13H          TTT          257
* .7X           TTT          258
0.13H000      000          259
* .23X,        1H*         260
* ./, 5X, 1H*, 44X
S.13HSSSS    SSSSS        261
165 FORMAT(   262
* .7X           5X, 1H*, 44X
S.13HSSSS    SSSSS        263
* .7X           SSSSS       264
T.13H          TTT          265
* .7X           TTT          266
0.13H000      000          267
* .23X,        1H*         268
* ./, 5X, 1H*, 44X
S.13HSSS     SSSSS        269
* .7X           SSSSS       270
T.13H          TTT          271
* .7X           TTT          272
* .7X           TTT          273
0.13H000      000          274
* .23X,        1H*         275
* ./, 5X, 1H*, 44X
S.13HSSS     SSSSS        276
170 FORMAT(   277
* .7X           5X, 1H*, 44X
S.13HSSS     SSSSS        278
* .7X           SSSSS       279
T.13H          TTT          280
* .7X           TTT          281
0.13H000      000          282
* .7X           TTT          283
P.13HPPPPPPPPPPPP  284
* .3X,        1H*         285
* ./, 5X, 1H*, 44X
285

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SUBROUTINE TFASTO      74 / 74   OPT 1

*    7X          AAAA  AAAA
*    A, 13H       AAAA  AAAA
*    ., 7X        AAAA  AAAA
*    S, 13HSSS    SS
*    ., 63X,     1H*)
140  FORMAT (           )
*    5X, 1H*, .4X
F, 13HFFFF
*    ., 7X
*    A, 13H       AAA
*    ., 7X        AAA
*    S, 13HSSS    S
*    ., 7X
T, 13HTTTTTTTTTTTTTT
*    ., 43X,     1H*)
*    ., /, 5X, 1H*, .4X
F, 13HFFFF
*    ., 7X
A, 13H       AAA
*    ., 7X        AAA
*    S, 13HSSS
*    ., 7X
T, 13HTTTTTTTTTTTTTT
*    ., 43X,     1H*)
145  FORMAT (           )
*    5X, 1H*, .24X
A, 13H AAA     AAA
*    ., 7X
S, 13HSSSS
*    ., 7X
T, 13HTTT   TTT   TTT
*    ., 43X,     1H*)
*    ., /, 5X, 1H*, .24X
A, 13H AAA     AAA
*    ., 7X
S, 13H SSSSSSSSS
*    ., 7X
T, 13H       TTT
*    ., 43X,     1H*)
150  FORMAT (           )
*    5X, 1H*, .24X
A, 13H AAA     AAA
*    ., 7X
S, 13H SSSSSSSSS
*    ., 7X
T, 13H       TTT
*    ., 43X,     1H*)
*    ., /, 5X, 1H*, .24X
A, 13HAAA    AAA
*    ., 7X
S, 13H
*    ., 7X
T, 13H       TTT
*    ., 43X,     1H*)
155  FORMAT (           )
*    5X, 1H*, .24X

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SUBROUTINE TFASTO    74/74   OPT:1           FTN 4.8+577
      115          * .43X, 36H.          AIR FORCE       ,4X, 1H*
                  * ./, 5X, 1H*, 4X
                  F, 13H FFFFFFFFFF
                  * .7X
      120          A, 13H     AAAAAA   120 FORMAT (      ,4X, 1H*)
                  * .43X, 36H.          FLIGHT DYNAMICS LABORATORY
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
      125          A, 13H     AAA AAA   * .43X, 36H.
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
                  * .7X
      130          A, 13H     AAA AAA   * .43X, 10H.        ,4A4, 10H
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
      135          A, 13H     AAA AAA   * .7X
                  S, 13H     SSSSSSSS
                  * .23X, 36H.
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
                  * .7X
      140          A, 13H     AAA AAA   * .23X, 36H.
                  S, 13H     SSSSSSSS
                  * .23X, 36H.        ..... ,4X, 1H*
      145          130 FORMAT (      ..... ,4X, 1H*)
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
      150          A, 13H     AAA AAA   * .7X
                  S, 13H     SSSSSS
                  * .63X, 1H*
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
                  * .7X
      155          A, 13H     AAAAAAAA
                  * .7X
                  S, 13HSSSS SSSS
      160          * .63X, 1H*)
                  135 FORMAT (      SSSS
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
                  * .7X
      165          A, 13H     AAAAAAAA
                  * ./, 5X, 1H*, 4X
                  F, 13H FF
                  * .7X
      170          S, 13HSSS SSSS
                  * .63X, 1H*
                  * ./, 5X, 1H*, 4X
      171          * .7X

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SUBROUTINE TEASIO    7A/7A    OBT = 1

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SUBROUTINE TFASTO 74/74 OPT=1

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```
1      C C45700, SUB TFASTO (TITLE FOR FLUTTER AND STR. OPTIMIZATION PROGRAM)          2
C *****                                         TFASTO 2
C *****                                         TFASTO 3
C *****                                         TFASTO 4
C *****                                         TFASTO 5
C ***   SUBROUTINE TFASTO *****               ***** TFASTO 5
C ***   OBJECTIVE *****                      ***** TFASTO 6
C ***   *****                                     ***** TFASTO 6
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C ***   *****                                     ***** TFASTO 58

20      COMMON /COMRWP/ ITAPER,ITAPEN,ITAPEP          1
       COMMON /CLIST / KOUNT ,KPAGE ,LINES ,KLINEST,KLABEL ,KTPAGE ,NPAGE          2
       1   COMMON /CTABLE/ KBPAGE ,LINESG ,KOUNTH          3
       COMMON /CTABLE/ KTABLE ,NPASS ,NROWS ,NCOLS ,NCOLST ,KTABLO ,NPAGEA          4
       1   COMMON /CAFFDL/ AFFDL          5

30      C PREPARE TABLE OF CONTENTS          6
       C KOUNT = LINES          7
       CALL TITLES (-1)          8
       NCOLS = 0          9
       NROWS = 2          10
       KTABLE = 2          11
       CALL PTABLE (1,60,60 *****)          12
       1 H***** *****)          13
       NROWS = 0          14
       KTABLE = 2          15
       CALL PTABLE (1,60,60 *****)          16
       1 H*          17
       KTABLE = 2          18
       CALL PTABLE (1,60,60 *****)          19
       1 'H*          20
       KTABLE = 2          21
       CALL PTABLE (2,60,60 *****)          22
       1 H*          23
       KOUNT = LINES          24

40      C LIST TITLE PAGE          25
       C WRITE (ITAPEN,100)          26
       WRITE (ITAPEN,105)          27
       WRITE (ITAPEN,110)          28
       WRITE (ITAPEN,115)          29
       WRITE (ITAPEN,120) AFFDL          30

55      5
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PROGRAM MAIN	74/74	OPT=1	FTN 4.8+577	85/01/23	08 10.44	PAGE	7
EXTERNALS			REFERENCES				
DVALUE	3	112					
FOP	0	196					
TFASTO	0	141					
TIMEB	2	147					
WORDS	3	98	99				
STATEMENT LABELS			DEF LINE REFERENCES				
O 132			114 113				
O 140			126 125				
LOOPS	LABEL	INDEX	FROM-TO LENGTH PROPERTIES				
56443	132	L	113 114 3B INSTACK				
56463	140	I	125 126 3B INSTACK				
COMMON BLOCKS	LENGTH		MEMBERS - BIAS NAME(LENGTH)				
COMRWP	3		O ITAPER (1)				
CTMH	38		O KTMH (1)				
MESAG	4		O KMESAG (1)				
CTFH	20		3 KTIMEL (1)				
CONSTS	2		O KTFH (1)				
CLIST	11		O NO (1)				
C TABLE	8		O KOUNT (1)				
REPORT	1		O KOUNT (1)				
CFMTAO	3		O KTABLE (1)				
COMPUT	2		O NCOLS (1)				
LABELS	6		O NPAGE (1)				
CAFFDL	4		O KREPOR (1)				
GENCOM	1578		O KTAO (3)				
FLPCOM	14400	ECS	O KMPUT (1)				
B COM	6400	ECS	O KFLABO (1)				
INCCOM	1802	ECS	3 KDLABI (1)				
STRCOM	5436	ECS	O AFDFL (4)				
			O DUMMY (1578)				
			O GKECS (3200)				
			O BECS (3200)				
			O GECS (1750)				
			1801 MSTORECS(1)				
			O JSETECS(50)				
			2551 NOTJECs(50)				
			2652 LDMECS (1)				
			2704 NDIMECS(1)				
			2775 DELMECS(35)				
			2880 DELGECS(35)				
			4175 HNECS (1225)				
STATISTICS							
PROGRAM LENGTH			3432B	1818			
BUFFER LENGTH			53120B	22096			
CM LABELED COMMON LENGTH			3220B	1680			
ECS LABELED COMMON LENGTH			66606B	28038			
52000B CM USED							

PROGRAM	MAIN	74/74	OPT=1
VARIABLES	SN	TYPE	RELOCATION
6	NPAGEA	INTEGER	CTABLE
1	NPASS	INTEGER	CTABLE
3410	NPMECS	INTEGER	INCOM
2	NROWS	INTEGER	CTABLE
5051	NTDMECS	INTEGER	STRCOM
56530	SHIFT	* REAL	REFS
6200	SOLECS	COMPLEX	FLPCOM
2	TFH	REAL	CTFH
56537	TMAIN	REAL	ARRAY
2	TMH	REAL	ARRAY
5264	XNECS	REAL	ARRAY
5221	XOECs	REAL	ARRAY
1	YES	INTEGER	CONSTS
5543	ZECS	REAL	ARRAY

FILE NAMES

MODE

O	INPUT
2054	OUTPUT
4130	TAPE16
7260	TAPE17
10334	TAPE18
11410	TAPE19
12464	TAPE20
13540	TAPE21
14614	TAPE22
15670	TAPE23
16744	TAPE24
20020	TAPE25
21074	TAPE26
22150	TAPE27
23224	TAPE28
24300	TAPE29
25354	TAPE30
26430	TAPE31
27504	TAPE32
30560	TAPE33
31634	TAPE34
32710	TAPE35
33764	TAPE36
35040	TAPE37
36114	TAPE38
37170	TAPE40
40244	TAPE41
41320	TAPE42
42374	TAPE43
43450	TAPE44
44524	TAPE45
45600	TAPE47
46654	TAPE48
47730	TAPE49
6204	TAPE5
51004	TAPE50
52060	TAPE57
53134	TAPE58
54210	TAPE59
2054	TAPE6

PROGRAM MAIN 74/74 OPT=1

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			FTN 4.8+577
REFS	51	DEFINED	123
REFS	51	DEFINED	124
REFS	67	74	
REFS	51		
REFS	68	74	
REFS	98		
REFS	62	65	
REFS	42	47	
REFS	41	115	
REFS	41	116	
REFS	41	112	
REFS	45	45	
REFS	68	74	
REFS	68	74	
REFS	37	48	
REFS	68	74	
			116
			115
			103

FILE NAMES	MODE
O	INPUT
2054	OUTPUT
4130	TAPE16
7260	TAPE17
10334	TAPE18
11410	TAPE19
12464	TAPE20
13540	TAPE21
14614	TAPE22
15670	TAPE23
16744	TAPE24
20020	TAPE25
21074	TAPE26
22150	TAPE27
23224	TAPE28
24300	TAPE29
25354	TAPE30
26430	TAPE31
27504	TAPE32
30560	TAPE33
31634	TAPE34
32710	TAPE35
33764	TAPE36
35040	TAPE37
36114	TAPE38
37170	TAPE40
40244	TAPE41
41320	TAPE42
42374	TAPE43
43450	TAPE44
44524	TAPE45
45600	TAPE47
46654	TAPE48
47730	TAPE49
6204	TAPE5
51004	TAPE50
52060	TAPE57
53134	TAPE58
54210	TAPE59
2054	TAPE6

PROGRAM	MAIN	74/74	OPT:1	
VARIABLES	SN	TYPE	RELOCATION	
0	GEC5	REAL	ARRAY	
0	GKECS	COMPLEX	ARRAY	
5435	GRNECS	REAL	ARRAY	
5372	GROECS	REAL	ARRAY	
12430	HGRECS	REAL	ARRAY	
10117	HNECS	REAL	ARRAY	
5606	HOECS	REAL	ARRAY	
56532	I	INTEGER	STRCOM	
5217	ICNECS	INTEGER	STRCOM	
12473	ICNVECS	INTEGER	STRCOM	
4	ITAPEL	INTEGER	LABELS	
2	ITAPEP	INTEGER	CWRWP	
0	ITAPER	INTEGER	CWRWP	
7	ITAPET	INTEGER	CTABLE	
1	ITAPEW	INTEGER	CWRWP	
62	JDIMECS	INTEGER	STRCOM	
0	JSETECS	INTEGER	STRCOM	
7	KBPAGE	INTEGER	CLIST	
3	KOLABI	INTEGER	LABELS	
1	KDLABO	INTEGER	LABELS	
2	KFLABI	INTEGER	LABELS	
0	KFLABO	INTEGER	LABELS	
5	KLABEL1	INTEGER	LABELS	
4	KLABEL	INTEGER	CLIST	
0	KMESAG	INTEGER	MESSAG	
0	KOMPUT	INTEGER	COMPUT	
0	KOUNT	INTEGER	CLIST	
11	KOUNTH	INTEGER	CLIST	
12	KOUNTI	INTEGER	CLIST	
1	KPAGE	INTEGER	REPORT	
0	KREPOR	INTEGER	CTABLE	
0	KTABLE	INTEGER	CTABLE	
5	KTABLO	INTEGER	CTFH	
0	KTFH	INTEGER	MESSAG	
0	KTIME	INTEGER	MESSAG	
3	KTIME1	INTEGER	MESSAG	
1	KTITLE	INTEGER	CTMH	
0	KTMH	INTEGER	CLIST	
5	KTPAGE	INTEGER	REFS	
5134	L	INTEGER	STRCOM	
2	LDMECS	INTEGER	CLIST	
10	LINES	INTEGER	CLIST	
3	LINESG	INTEGER	CLIST	
63	LMKECS	INTEGER	ARRAY	
5052	LNDECS	INTEGER	STRCOM	
1	LTFH	INTEGER	CTFH	
1	LTMH	INTEGER	CTMH	
3411	MSTRECS	INTEGER	INCCOM	
1	NCHARW	INTEGER	COMPUT	
3	NCOLS	INTEGER	CTABLE	
4	NCOLST	INTEGER	CTABLE	
5220	NDIMECS	INTEGER	STRCOM	
0	NO	INTEGER	CONSTS	
4767	NOTJEC5	INTEGER	STRCOM	
5135	NOTTECS	INTEGER	STRCOM	
6	NPAGE	INTEGER	CLIST	

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PROGRAM	MAIN	74/74	OPT:1	
VARIABLES	SN	TYPE	RELOCATION	
0	GEC5	REAL	ARRAY	
0	GKECS	COMPLEX	ARRAY	
5435	GRNECS	REAL	ARRAY	
5372	GROECS	REAL	ARRAY	
12430	HGRECS	REAL	ARRAY	
10117	HNECS	REAL	ARRAY	
5606	HOECS	REAL	ARRAY	
56532	I	INTEGER	STRCOM	
5217	ICNECS	INTEGER	STRCOM	
12473	ICNVECS	INTEGER	STRCOM	
4	ITAPEL	INTEGER	LABELS	
2	ITAPEP	INTEGER	CWRWP	
0	ITAPER	INTEGER	CWRWP	
7	ITAPET	INTEGER	CTABLE	
1	ITAPEW	INTEGER	CWRWP	
62	JDIMECS	INTEGER	STRCOM	
0	JSETECS	INTEGER	STRCOM	
7	KBPAGE	INTEGER	CLIST	
3	KOLABI	INTEGER	LABELS	
1	KDLABO	INTEGER	LABELS	
2	KFLABI	INTEGER	LABELS	
0	KFLABO	INTEGER	LABELS	
5	KLABEL1	INTEGER	LABELS	
4	KLABEL	INTEGER	CLIST	
0	KMESAG	INTEGER	MESSAG	
0	KOMPUT	INTEGER	COMPUT	
0	KOUNT	INTEGER	CLIST	
11	KOUNTH	INTEGER	CLIST	
12	KOUNTI	INTEGER	CLIST	
1	KPAGE	INTEGER	REPORT	
0	KREPOR	INTEGER	CTABLE	
0	KTABLE	INTEGER	CTABLE	
5	KTABLO	INTEGER	CTFH	
0	KTFH	INTEGER	MESSAG	
0	KTIME	INTEGER	MESSAG	
3	KTIME1	INTEGER	MESSAG	
1	KTITLE	INTEGER	CTMH	
0	KTMH	INTEGER	CLIST	
5	KTPAGE	INTEGER	REFS	
5134	L	INTEGER	STRCOM	
2	LDMECS	INTEGER	CLIST	
10	LINES	INTEGER	CLIST	
3	LINESG	INTEGER	CLIST	
63	LMKECS	INTEGER	ARRAY	
5052	LNDECS	INTEGER	STRCOM	
1	LTFH	INTEGER	CTFH	
1	LTMH	INTEGER	CTMH	
3411	MSTRECS	INTEGER	INCCOM	
1	NCHARW	INTEGER	COMPUT	
3	NCOLS	INTEGER	CTABLE	
4	NCOLST	INTEGER	CTABLE	
5220	NDIMECS	INTEGER	STRCOM	
0	NO	INTEGER	CONSTS	
4767	NOTJEC5	INTEGER	STRCOM	
5135	NOTTECS	INTEGER	STRCOM	
6	NPAGE	INTEGER	CLIST	

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REF LINE	REFERENCES
VARIABLES	SN	TYPE	RELOCATION
MAIN	56417		
AEC5	25700	COMPLEX	FLP COM
AFFDL	0	REAL	ARRAY
BBCS	6200	COMPLEX	CAFFDL
BCOECS	3326	REAL	BCDM
BECS	0	COMPLEX	INCCOM
BLANK	56522	REAL	BCOM
DATE	56533	REAL	REFS
DELGECS	5500	REAL	STR COM
DELXECS	5327	REAL	STR COM
DOTS	56523	REAL	REFS
DUMMY	0	REAL	GEN COM
EMTAR	0	REAL	REFS
SENTAC	0	REAL	SEN TAC



```

PROGRAM MAIN      74/74    OPT=1          FTN 4.8+577   85/01/23. OB. 10.44 PAGE
C
CCDC  COMMON /GENCOM/ DUMMY(1578)
       COMPLEX GKECS(40,40),AECS(40,40),SOLECS(40,100)
       COMPLEX BECS(40,40),BBECS(40,40)

60
       COMMON /FLPCOM/ GKECS,SOLECS,AECS
       COMMON /BCOM/ BECS,BBECs
       COMMON /INCCOM/ GECS(35,50),BGECS(50),NPMECS,MSTRECS
       COMMON /STRCOM/ JSETECS(50),JDIMECS,LMECS(50,50),NOTJECs(50),
1      NTDMECS,LNDMECS(50),LDMECS,NOTTECS(50),ICNECS,NDIMECS,
2      XOECS(35),XNECS(35),DELXECs(35),GROECS,GRNECS,
3      DELGECS(35),ZECS(35),HDECS(35,35),HNECS(35),HGRECs(35),
4      ICNEVCs

65
       LEVEL 3, GKECS,SOLECS,AECS,BECS,BBECs,GECS,BGECS,NPMECS,MSTRECS,
1      JSETECS,JDIMECS,LMECS,NOTJECs,NDIMECS,LNDMECS,
2      NOTTECS,ICNECS,NDIMECS,XOECs,XNECS,DELXECs,GROECS,GRNECS,
3      DELGECS,ZECS,HDECS,HNECS,HGRECs,ICNEVCs

70
       CCDC

C1BM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C EXTENDED ERROR HANDLING PACKAGE
C 100 CONTINUE
C CALL ERSET (207,0,0,2,ERROR,301)
C CALL ERSET (208,0,0,2,1,0)
C CALL ERSET (210,0,0,2,1,0)
C CALL ERSET (215,0,0,2,1,0)
C1BM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C

80
C INITIAL CONDITIONS
C
C DATA BLANK /4H / /
C DATA DOTS /4H.../
C DATA TMAIN /4H FAS,4HTOP /
C DATA DATE /4H ,4HJULY,4H 197,4H5 /
C CALL WORDS (SHIFT,1,4H(10X))
C CALL WORDS (FMTAO,3,12H(10X,18A4) )
C
C LTMH = 18
C LINES = 54
C NO = 1
C YES = 2
C KTFH = NO
C LTFH = 18
C LINEST = 4
C KOUNT = LINES
C KPAGE = 2
C NPAGE = 0
C KTPAGE = 2
C KBPAGE = 2
C CALL DVALUE (TMH,BLANK,2*LTMH)
DO 132 L=1,LTMH
132 TMH = 132

```

SUBROUTINE TFASTO 74/74 OPT=1

VARIABLES	SN	TYPE	RELOCATION	REFS
10	LINESG	INTEGER	C LIST	19
3	LINEST	INTEGER	C LIST	19
3	NCOLS	INTEGER	C TABLE	21
4	NCOLST	INTEGER	C TABLE	21
6	NPAGE	INTEGER	C LIST	19
6	NPAGEA	INTEGER	C TABLE	21
1	NPASS	INTEGER	C TABLE	21
2	NROWS	INTEGER	C TABLE	21
2	VARIABLES USED AS FILE NAMES. SEE ABOVE			

35

46

46

## STATEMENT LABELS

DEF	LINE	REFERENCES	REFERENCES
251	100	FMT	77
302	105	FMT	89
331	110	FMT	99
354	115	FMT	110
377	120	FMT	121
421	125	FMT	132
450	130	FMT	147
467	135	FMT	162
506	140	FMT	177
530	145	FMT	196
547	150	FMT	211
566	155	FMT	226
611	160	FMT	245
630	165	FMT	260
647	170	FMT	275
671	175	FMT	294
710	180	FMT	309
727	185	FMT	324
757	190	FMT	341
1004	195	FMT	356
1035	200	FMT	373
1066	205	FMT	390
1125	210	FMT	409
1157	215	FMT	425

## COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

COMRWP	3	O ITAPER (1)	1 ITAPEP (1)
CLIST	10	O KOUNT (1)	1 KPAGE (1)
		3 LINEST (1)	4 KLABEL (1)
		6 NPAGE (1)	7 KBPAGE (1)
CTABLE	8	9 KOUNTH (1)	
		O KTABLE (1)	2 ROWS (1)
		3 NCOLS (1)	5 KTABLO (1)
CAFFDL	4	6 NPAGEA (1)	
		O AFIDL (4)	

STATISTICS  
 PROGRAM LENGTH 1231B 665  
 CM LABELED COMMON LENGTH 31E 25  
 52000B CM USED



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PAGE 2

C INPUT DATA CONTROL WORD OPTIONS FOR PERFORMING CERTAIN ANALYSES \* FOP 59  
C AND/OR OPTIMIZATIONS. \* FOP 60  
C VALUES ENTERED AS DATA HAVE THE FOLLOWING GENERAL FUNCTION \* FOP 61  
C KLUE( 1) = O. DO NOT PERFORM THE I'TH ANALYSIS AND/OR \* FOP 62  
C OPTIMIZATION. \* FOP 63  
C = 1. PERFORM THE I'TH ANALYSIS AND/OR OPTIMIZATION \* FOP 64  
C WHERE THE SPECIFIC FUNCTION OF EACH VARIABLE IS \* FOP 65  
C KLUE( 1) = O. DUMMY OPTION \* FOP 66  
C KLUE( 2) = O. DUMMY OPTION \* FOP 67  
C KLUE( 3) = O. DO NOT PERFORM VIBRATION ANALYSIS \* FOP 68  
C = 3. PERFORM VIBRATION ANALYSIS \* FOP 69  
C KLUE( 4) = O. DO NOT PERFORM FLUTTER ANALYSIS \* FOP 70  
C = 4. PERFORM FLUTTER ANALYSIS \* FOP 71  
C KLUE( 5) = O. DUMMY OPTION \* FOP 72  
C KLUE( 6) = O. DUMMY OPTION \* FOP 73  
C KLUE( 7) = O. DO NOT PERFORM FLUTTER OPTIMIZATION \* FOP 74  
C = 7. PERFORM FLUTTER OPTIMIZATION \* FOP 75  
C KLUE( 8) = O. RESULTS ARE NOT TO BE INCLUDED IN A REPORT \* FOP 76  
C = 8. RESULTS ARE TO BE INCLUDED IN A REPORT (THEREFORE \* FOP 77  
C WHERE APPROPRIATE, RESULTS WILL BE LISTED ON EIGHT \* FOP 78  
C AND ONE HALF BY ELEVEN PAPER.) \* FOP 79  
C KLUE( 9) = O. DO NOT LIST LABELS OF FILES GENERATED BY DSIO \* FOP 80  
C = 9. LIST LABELS OF FILES GENERATED BY DSIO \* FOP 81  
C (DISK SEQUENTIAL INPUT/OUTPUT). \* FOP 82  
C KLUE( 10) = O. DO NOT LIST MESSAGES UPON ENTERING AND LEAVING \* FOP 83  
C SUBROUTINES \* FOP 84  
C = 10. LIST MESSAGES UPON ENTERING AND LEAVING \* FOP 85  
C SUBROUTINES \* FOP 86  
C KLUE( 11) = O. DO NOT LIST MAIN HEADING \* FOP 87  
C = 11. LIST MAIN HEADING ENTERED AS CARD DATA \* FOP 88  
C KLUE( 12) = O. DO NOT LIST SUBHEADING \* FOP 89  
C = 12. LIST SUBHEADING ENTERED AS CARD DATA \* FOP 90  
C KLUE( 13) = O. DO NOT LIST INTERMEDIATE LABELS \* FOP 91  
C = 13. LIST INTERMEDIATE LABELS \* FOP 92  
C KLUE( 14) = O. DO NOT LIST COMPUTER TIMES \* FOP 93  
C = 14. LIST COMPUTER TIMES \* FOP 94  
C KLUE( 15) = O. DUMMY OPTION \* FOP 95  
C KLUE( 16) = O. DUMMY OPTION \* FOP 96  
C KLUE( 17) = O. DUMMY OPTION \* FOP 97  
C KLUE( 18) = O. DUMMY OPTION \* FOP 98  
C KLUE( 19) = O. DUMMY OPTION \* FOP 99  
C KLUE( 20) = O. DUMMY OPTION \* FOP 100  
C KLUE( 21) = O. DUMMY OPTION \* FOP 101  
C KLUE( 22) = O. DUMMY OPTION \* FOP 102  
C KLUE( 23) = O. DUMMY OPTION \* FOP 103  
C KLUE( 24) = O. DUMMY OPTION \* FOP 104  
C KLUE( 25) = O. DUMMY OPTION \* FOP 105  
C KLUE( 26) = O. THIS IS INITIAL PASS THROUGH FOP \* FOP 106  
C = 26. THIS IS NOT THE FIRST PASS THROUGH FOP \* FOP 107  
C KLUE( 27) = O. VIBRATION ANALYSIS WILL USE STIFFNESS MATRIX \* FOP 108  
C = 27. VIBRATION ANALYSIS WILL USE FLEXIBILITY MATRIX \* FOP 109  
C KLUE( 28) = O. INITIAL DYNAMIC MASS MATRIX IS (WAS) SUPPLIED BY \* FOP 110  
C USER IN FIRST FOP PASS \* FOP 111  
C =>R IFSE FULLY AUTOMATED MASS OPTION TO COMPUTE DYNAMIC \* FOP 112  
C PAGE 113  
C FOP 114  
C FOP 115

115 C MASS MATRIX (USER-SUPPLIED) FIXED MASS ITEMS TO BE FOP  
 C CONSIDERED IN FULLY AUTOMATED MASS OPTION FOP  
 C =29. FIXED MASS ITEMS ARE TO BE CONSIDERED IN THE FULLY FOP  
 C AUTOMATED MASS OPTION FOP  
 120 C THE FIXED MASS ITEMS IN THE FULLY AUTOMATED MASS FOP  
 C OPTION DO NOT CONTRIBUTE TO THE OFF-DIAGONAL TERMS FOP  
 C OF THE STRUCTURAL MASS MATRIX FOP  
 C =30. FIXED MASS ITEMS IN THE FULLY AUTOMATED MASS OPTION FOP  
 C DO CONTRIBUTE TO THE OFF-DIAGONAL TERMS OF THE FOP  
 C STRUCTURAL MASS MATRIX FOP  
 C =31. THERE ARE NO MASS BALANCE VARIABLES PRESENT FOP  
 C MASS BALANCE VARIABLES ARE PRESENT IN THE PROBLEM FOP  
 C DO NOT SUPERSEDE EXISTING MASS BALANCE DATA WITH FOP  
 C NEW DATA FOP  
 130 C =32. NEW MASS BALANCE DATA ARE BEING SUPPLIED TO FOP  
 C OVERRIDE EXISTING DATA FOP  
 C =33. IN THE MOST RECENT SOP STEP, THAT PROGRAM WAS SIMPLY FOP  
 C USED TO COMPUTE THE DYNAMIC FLEXIBILITY MATRIX OR FOP  
 C THE STRUCTURAL STIFFNESS MATRIX. THAT IS, SOP WAS FOP  
 C NOT USED TO ANALYZE OR REDESIGN. FOP  
 135 C =33. IN THE LAST PASS THROUGH SOP, THAT PROGRAM DID FOP  
 C ANALYZE OR REDESIGN THE STRUCTURE FOP  
 C =34. COMPUTE FLUTTER VELOCITY DERIVATIVES FOR ALL FOP  
 C STRUCTURAL MEMBERS AND MASS BALANCE VARIABLES. BUT FOP  
 C DO NOT REDESIGN THE STRUCTURE FOR FLUTTER FOP  
 C COMPUTE FLUTTER VELOCITY DERIVATIVES ONLY FOR FOP  
 C FLUTTER REDESIGN VARIABLES (SEE KLUE(36)). PERFORM FOP  
 C FLUTTER REDESIGN(S). AND PREPARE OUTPUT TAPES FOP  
 C REQUIRED FOR SUBSEQUENT USE BY SOP AND FOP FOP  
 140 C KLUE(35) = 0. THERE ARE NO NON-OPTIMUM WEIGHT FACTORS IN THE FOP  
 C PROBLEM FOP  
 C =35. NON-OPTIMUM WEIGHT FACTORS ARE PRESENT IN THE FOP  
 C PROBLEM FOP  
 C KLUE(36) = 0. DO NOT EXCLUDE ANY STRUCTURAL MEMBERS FROM THE FOP  
 C FLUTTER REDESIGN PROCESS FOP  
 C =36. EXCLUDE SPECIFIED STRUCTURAL MEMBERS FROM THE FOP  
 C FLUTTER REDESIGN PROCESS FOP  
 145 C KLUE(37) = 0. PERFORM A CANTILEVER VIBRATION ANALYSIS FOP  
 C =37. PERFORM A FREE-FREE VIBRATION ANALYSIS FOP  
 150 C THE VALUES OF THE CARD INPUT DATA CONTROL WORD OPTIONS (KLUE (J)) \* FOP  
 C GIVEN ABOVE ARE ENTERED INTO THE PROGRAM BY THE SUBROUTINE CLUES \* FOP  
 C AND THEN CHANGED, WITHIN THE SUBROUTINE CLUES, TO A NEW SET OF \* FOP  
 C NUMERICAL VALUES \* FOP  
 155 C A VALUE OF ONE (CORRESPONDING TO THE ORIGINAL ZERO VALUE) \* FOP  
 C INDICATES THAT THE OPTION IS TO BE DELETED WHEREAS A VALUE OF TWO \* FOP  
 C (CORRESPONDING TO THE ORIGINAL 1'TH VALUE) INDICATES THAT THE \* FOP  
 C OPTION IS TO BE EXERCISED \* FOP  
 C FINALLY, FOR PROGRAMMING CONVENIENCE, A NEW SET OF OPTIONS \* FOP  
 C REFERRED TO AS PROGRAM CONTROL WORD OPTIONS (KXXXXX) ARE DEFINED \* FOP  
 C TO BE EQUIVALENT TO THE CARD INPUT CONTROL WORD OPTIONS. \* FOP  
 160 C KLUE (1) = 0. IS CHANGED TO 1, AND CORRESPONDS TO KXXXXX = 1 \* FOP  
 C KLUE (1) = 1, IS CHANGED TO 2, AND CORRESPONDS TO KXXXXX = 2 \* FOP  
 165 C THE SPECIFIC RELATIONSHIP OF THE CARD INPUT DATA AND PROGRAM \* FOP  
 170 C

CONTROL WORD OPTIONS IS GIVEN BELOW

```

173   CONTROL WORD OPTIONS IS GIVEN BELOW
174
175   KLUE ( 3) = KANAV
176   KLUE ( 4) = KANA F
177   KLUE ( 7) = KOPTF
178   KLUE ( 8) = KREPOR
179   KLUE ( 9) = KLABEL
180   KLUE (10) = KMESAG
181   KLUE (11) = KTMH
182   KLUE (12) = KTSH
183   KLUE (13) = KLABEI
184   KLUE (14) = KTIMEL
185   KLUE (26) = KPASS
186   KLUE (27) = KRED
187   KLUE (28) = KMASSA
188   KLUE (29) = KMASSD
189   KLUE (30) = KMASSO
190   KLUE (31) = KMASSB
191   KLUE (32) = KBALUP
192   KLUE (33) = KSTRER
193   KLUE (34) = KRESIZ
194   KLUE (35) = KNOTP
195   KLUE (36) = KIDFIX
196   KLUE (37) = KFREE

197   KLUE(I) .... INTERMEDIATE. (I = LKLUE+1, ..., 2*LKLUE)
198   PROGRAM CONTROL WORD OPTION FOR INDICATING WHICH OF THE ANALYSES
199   AND/OR OPTIMIZATIONS HAVE BEEN PERFORMED.
200
201   VALUES DEFINED WITHIN THE PROGRAM HAVE THE FOLLOWING GENERAL
202   FUNCTION
203   KLUE(I) = 0, THE I'TH ANALYSIS AND/OR OPTIMIZATION HAS NOT BEEN
204   PERFORMED IN THE CURRENT RUN.
205   = 1, THE I'TH ANALYSIS AND/OR OPTIMIZATION HAS BEEN
206   PERFORMED IN THE CURRENT RUN.

207   WHERE THE SPECIFIC FUNCTION OF EACH VARIABLE IS ASSOCIATED WITH
208   THE SPECIFIC FUNCTION OF THE VARIABLE KLUE(I) FOR
209   I = 1, ..., LKLUE.

210   KLUEF(I) .... INPUT (SEE SUBROUTINE FLUTA)
211   INPUT DATA CONTROL WORD OPTION FOR PERFORMING FLUTTER ANALYSIS.
212
213   KLUEV(I) .... INPUT (SEE SUBROUTINE VIBRA)
214   INPUT DATA CONTROL WORD OPTION FOR PERFORMING VIBRATION ANALYSIS.
215
216   TMH(I) .... INTERMEDIATE
217   TITLE CONSISTING OF TWO CARDS FOR LISTING AT THE TOP OF EACH
218   PAGE OF THE LISTED RESULTS.

219   ***** SUBROUTINE FOP *****

220   ***** SUBROUTINE FOP *****

221   ***** SUBROUTINE FOP *****

222   ***** SUBROUTINE FOP *****

223   ***** SUBROUTINE FOP *****

224   ***** SUBROUTINE FOP *****

225   ***** SUBROUTINE FOP *****

226   ***** SUBROUTINE FOP *****

227   ***** SUBROUTINE FOP *****

228   ***** SUBROUTINE FOP *****

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C C MASS MATRIX = O. THERE ARE NO (USER-SUPPLIED) FIXED MASS ITEMS TO BE  
 C C CONSIDERED IN FULLY AUTOMATED MASS OPTION  
 C C =29. FIXED MASS ITEMS ARE TO BE CONSIDERED IN THE FULLY  
 C C AUTOMATED MASS OPTION  
 C C KLU(E(29)) = O. THE FIXED MASS ITEMS IN THE FULLY AUTOMATED MASS  
 C C OPTION DO NOT CONTRIBUTE TO THE OFF-DIAGONAL TERMS  
 C C OF THE STRUCTURAL MASS MATRIX  
 C C =30. FIXED MASS ITEMS IN THE FULLY AUTOMATED MASS OPTION  
 C C DO CONTRIBUTE TO THE OFF-DIAGONAL TERMS OF THE  
 C C STRUCTURAL MASS MATRIX  
 C C KLU(E(31)) = O.  
 C C =31. THERE ARE NO MASS BALANCE VARIABLES PRESENT  
 C C KLU(E(32)) = O.  
 C C DO NOT SUPERSEDE EXISTING MASS BALANCE DATA WITH  
 C C NEW DATA  
 C C =32. NEW MASS BALANCE DATA ARE BEING SUPPLIED TO  
 C C OVERRIDE EXISTING DATA  
 C C KLU(E(33)) = O. IN THE MOST RECENT SOP STEP, THAT PROGRAM WAS SIMPLY  
 C C USED TO COMPUTE THE DYNAMIC FLEXIBILITY MATRIX OR  
 C C THE STRUCTURAL STIFFNESS MATRIX. THAT IS, SOP WAS  
 C C NOT USED TO ANALYZE OR REDESIGN.  
 C C =33. IN THE LAST PASS THROUGH SOP, THAT PROGRAM DID  
 C C ANALYZE OR REDESIGN THE STRUCTURE  
 C C KLU(E(34)) = O. COMPUTE FLUTTER VELOCITY DERIVATIVES FOR ALL  
 C C STRUCTURAL MEMBERS AND MASS BALANCE VARIABLES. BUT  
 C C DO NOT REDESIGN THE STRUCTURE FOR FLUTTER  
 C C =34. COMPUTE FLUTTER VELOCITY DERIVATIVES ONLY FOR  
 C C FLUTTER REDESIGN VARIABLES (SEE KLU(E36)). PERFORM  
 C C REQUIRED FOR SUBSEQUENT USE BY SOP AND FOP  
 C C KLU(E(35)) = O. THERE ARE NO NON-OPTIMUM WEIGHT FACTORS IN THE  
 C C PROBLEM  
 C C =35. NON-OPTIMUM WEIGHT FACTORS ARE PRESENT IN THE  
 C C PROBLEM  
 C C KLU(E(36)) = O. DO NOT EXCLUDE ANY STRUCTURAL MEMBERS FROM THE  
 C C FLUTTER REDESIGN PROCESS  
 C C =36. EXCLUDE SPECIFIED STRUCTURAL MEMBERS FROM THE  
 C C FLUTTER REDESIGN PROCESS  
 C C KLU(E(37)) = O. PERFORM A CANTILEVER VIBRATION ANALYSIS  
 C C =37. PERFORM A FREE-FREE VIBRATION ANALYSIS  
 C C  
 C C THE VALUES OF THE CARD INPUT DATA CONTROL WORD OPTIONS (KLU(E(J)))  
 C C GIVEN ABOVE ARE ENTERED INTO THE PROGRAM BY THE SUBROUTINE CLUES  
 C C AND THEN CHANGED, WITHIN THE SUBROUTINE CLUES, TO A NEW SET OF  
 C C NUMERICAL VALUES  
 C C A VALUE OF ONE (CORRESPONDING TO THE ORIGINAL ZERO VALUE)  
 C C INDICATES THAT THE OPTION IS TO BE DELETED WHEREAS A VALUE OF TWO  
 C C (CORRESPONDING TO THE ORIGINAL 1' TH VALUE) INDICATES THAT THE  
 C C OPTION IS TO BE EXERCISED.  
 C C FINALLY, FOR PROGRAMMING CONVENIENCE, A NEW SET OF OPTIONS  
 C C REFERRED TO AS PROGRAM CONTROL WORD OPTIONS (KXXXXX) ARE DEFINED  
 C C TO BE EQUIVALENT TO THE CARD INPUT CONTROL WORD OPTIONS.  
 C C KLU(E(1)) = O, IS CHANGED TO 1, AND CORRESPONDS TO KXXXXX = 1  
 C C KLU(E(1)) = I, IS CHANGED TO 2, AND CORRESPONDS TO KXXXXX = 2  
 C C



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CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      230
C   EXTERNAL ERROR
C   DOUBLE PRECISION ELSTF
C   DOUBLE PRECISION DATER 'REEL02
C   DOUBLE PRECISION FS1ONS,DS1ONS
CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      235
C   COMPLEX UMOD,VMOD
C
CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS      236
C   INTEGER FET,BUFFER,BUFSZ,OLDOP,BUFSZD
C   DIMENSION BUFFER(513,12) ,BUFSZ(12)
C   DIMENSION FET(54,12)
CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS      237
C
C   DIMENSION DRVMB(20),DRVMBD(20)
C   DIMENSION EMP(3,3)
C   DIMENSION FMTA(2) ,FMTBD(3)
C   1   ,FMTB(3) ,FMTCD(8)
C   2   ,FSICNS(20)
C   DIMENSION DS1ONS(20)
C   DIMENSION IDBAL(20)
C   DIMENSION ITAPES(50) ,IFILES(50)
C   1   ,ISETUP(45) ,IPOS(20)
C   DIMENSION JSETUP(25) ,KLUUEF(20)
C   DIMENSION KLU(80)
C   DIMENSION KLUFO(20)
C   DIMENSION MBDOF(20,3)
C   DIMENSION NFUF(20,3) ,NDUF(20,3)
C
C   **** THE FOLLOWING LINE OF FASTOP CODE HAS *
C   **** BEEN COMMENTED OUT BECAUSE IT IS NOT *
C   **** USED IN THE CURRENT VERSION OF ESP .
C   ****
C   DIMENSION ELSTF(24,24),PATTY(6),NSTART(8),NGO(8)
C
C   DIMENSION PHP(3,40)
C   DIMENSION S1MB(20),S2MB(20),S3MB(20)
C   DIMENSION TSHFO(18) ,TSH(18) ,TMH(18,2)
C   1   ,TSHV(18) ,TSHF(18) ,TITLEI(18)
C   2   ,TITLE(18,2)
C   DIMENSION TFH(18)
C   DIMENSION UMOD(40) ,VMOD(40) ,IDMODE(40)
C   DIMENSION VMBIN(20),VMBNEW(20),VMBOLD(20)
C
CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS      238
C   COMMON /DCOM1 / MAXUNTS,MAXFILS,OLDOP,BUFSZ
C   COMMON /DCOM2 / FET
C   COMMON /DCOM3 / BUFFER
CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS      239
C
C   COMMON /CTAPES/ ITAPES
C   COMMON /CLUEM / LKLU
C   COMMON /CLUEV / KLUVE ,KLUEV
  
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SUBROUTINE E08      74/74      OPT=1

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SUBROUTINE FOP      74/74      OPT=1

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2 .IUMPL,IFMPL,IUSLT,IFSLT,IUDLT,IFDLT
3 COMMON/KLUES/ IUGA,IFQA,IUQAT,IFOAT,IUPHA,IFPHA,IUPHAT,IFPHAT
1 1 VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND,
2 2 IFIN,KLUU,KLUQ,MORBAL,DBAL
COMMON /KLUFF/ KFREE
COMMON/COLS/ IT,IMINT,IMAXT,IDENS,IOLDT,IOLDW,ISRT,IMINT,
A IMINTT INPUT.
1 NVAR,JWPUT,JINITT,JMINT,JMAXT,JOLDT,JNEWT,JDRV.
2 COMMON/SIZES/ NSTMEM,NSTDOF,NYDODF,MNOPT,INDESNO,INDESYS
C ****
C * THE FOLLOWING LINE OF FASTOP CODE HAS *
C * BEEN COMMENTED OUT BECAUSE IT IS NOT *
C * USED IN THE CURRENT VERSION OF ESP *
C ****
C COMMON /ELMTNT/ ELSTF,PATTY,NSTART,NGO
C
COMMON/BANDW/ IBANDW
COMMON/WAYTS/ WINITT,WST,WMB,WBOTH,WPRES,DW
COMMON /CIDIV / IDIV
COMMON /CORE / KORE ,KOREDP
COMMON /CLUFO/ LKLUFO,KLUFO
COMMON /PLUG/ EMP,PHP
COMMON /CPLOTS/ KPLOTS
COMMON /CPLOTF/ KPLOTF
COMMON /STORES/ NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)
A STRWI(5),STRWN(5),STRI1(5,3),STRIO(5,3)
B STRIN(5,3),STRRI1(5,3),STRRO(5,3),STRRN(5,3)
C STRWD0(5),STRWDN(5),STRIDO(5,3),STRDN(5,3)
D STRRD0(5,3),STRRDN(5,3),SCALE(5,7)
COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD
COMMON /LOGSTR/ IUSTRI,IFSTRI,IUMREF,IMREF
1 IUMOD,IFMOD
COMMON/RESIZE/ ISIZE,SCLINEW(5,4),SCLDLD(5,4),ITESTO,SAVSTP,IDUB
COMMON/ACCEL/ ISTOP,IPAR,DNEW(5),DINEW(5,3),DWOLD(5),DIOLD(5,3)
1 RILSTP
ICYCLE = 0
IIII = 0
M3 = 0
M4 = 3
JJJJ = 0
M5 = 0
M6 = 0
M7 = 0
S1OLD = 0.0
KCONST = 0
C PRINT TITLE FOR FLUTTER OPTIMIZATION PACKAGE
C CALL TFOP
C INITIALIZE THE VARIABLES
C 200 CONTINUE

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SUBROUTINE FOP

FTN 4 .8+577

85/01/23 . 08.10.44

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400      C   CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
        C   LTITLE = 18
        C   CALL WORDS (FMTB,'3, 12H(18A4)
        C   CALL WORDS (FMTBO,4,16H(10X,18A4)
        C   CALL WORDS (FMTCO,8,32H(10X, 2HJ=,12,1H,1X 18A4) )
        C   KOMPUT = 1
        C   TOL   = 1 0E-08
        C   TOL1  = 1 0E-03
        C   TOL2  = 3 0E-07
        C   MINUS2 = -2
        C   IOINC = 0
        C   NBYTES = 8
        C   KBLAB = 2
        C   IDIV  = 1
        C   ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
        C
        C   CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
        C   LTITLE = 8
        C   CALL WORDS (FMTB,3,12H(7A10,1A2)
        C   CALL WORDS (FMTBO,4,16H(10X,7A10,1A2)
        C   CALL WORDS (FMTCO,8,32H(10X, 2HJ=,12,1H,1X,7A10, 1A2) )
        C   KOMPUT = 2
        C   TOL   = 1.0E-13
        C   TOL1  = 1.0E-03
        C   TOL2  = 1.0E-13
        C   DATA MINUS /777777777777777776B/
        C   MINUS2 = MINUS
        C   IOINC = 3
        C   NBYTES = 4
        C   KBLAB = 2
        C   IDIV  = 1
        C   ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
        C
        C   NO   = 1
        C   YES  = 2
        C   KPLOTS = YES
        C   KPLOTV = NO
        C   KPLOTF = NO
        C   KLUED = 80
        C   LKLUU = KLUED/2
        C   NKLUE=LKLUU
        C   KLUEVD = 20
        C   LKLUUV = KLUEVD/2
        C   KLUEFD = 20
        C   LKLUFF = KLUEFD/2
        C   KLESED=30
        C   LKLESE=LKLESED/2
        C   NKLESE=LKLESE
        C   KLUFOD=20
        C   LKLUFOD=KLUFOD/2
        C   IONE = 1
        C   NCC  = 10
        C   LTSH = 18
        C   LTSHV = LTSH
        C   LTSHF = LTSH

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401      FOP 401
        FOP 402
        FOP 403
        FOP 404
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        FOP 406
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        FOP 456
        FOP 457

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        LTSHF0 = LTSH      458
        KTFH = NO        459
        LTFH = LTSH      460
460      NROWS = 2       461
        NCOLS = 0       462
        LINESG = LINES + 1 463
        KFLABO = 2       464
        KDLABO = 2       465
        KELABI = 1       466
        KDLABI = 1       467
        KROUP = -1      468
        LTITLE = 18      469
        CALL DATE(DATER) 470
        CALL WORDS (FMTA,2,BH(18A4)) 470
        KASE = 0         471
470      MTAPES = 50      472
        ITAPES(1) = MTAPES 473
        MPOS = 20        474
        IPOS(1) = MPOS   475
        CALL SETUP (2)   476
        ITAPER = ITAPES(5) 477
        ITAPEW = ITAPES(6) 478
        ITAPEP = ITAPES(7) 479
        IUCD=ITAPER    480
        IUPR=ITAPEW    481
        ITAPET = ITAPES(19) 482
        ITAPEL = ITAPES(19) 483
C
C      C INITIALIZE THE VARIABLES AND LIST DATA 484
        NCOL = 80        485
        KHEAD = 2          486
        NTAPEI = 16        487
        CALL WORDS (SKIP,1.4H20,) 487
485      KOUNT = LINES   488
        KTABLE = 2          489
        CALL LDB (NCOL,KHEAD,NTAPEI,ITAPER,ITAPEW,SKIP) 490
C
C      C READ INPUT DATA 491
        135 KASE = KASE + 1 492
        CALL IVALUE (KLUE ,IONE,KLUED) 493
        CALL IVALUE (KLUEV,IONE,KLUEDV) 494
        CALL IVALUE (KLUEF,IONE,KLUEDF) 495
        READ (ITAPER,5025) PACAGE, LINESI 496
        DO 140 I=1,2 497
        CALL EOFO1 (ITAPER,TMH(1,1),LTMH,KEOF) 498
        IF (KEOF .EQ. 2) GO TO 1000 499
140      CONTINUE 500
        KOUNT = LINES   501
        KTITLE = 1          502
        CALL TIMEB (38,38) 503
        IFFROM FOP . AFTER LDB - LIST INPUT DATA) 504
        KTITLE = 2          505
        READ (ITAPER,5010) MTITLE 506
        IF (MTITLE .EQ. 0) GO TO 160 507
        DO 150 K=1,MTITLE 508
150      FOP . 509
        FOP . 510
        FOP . 511
        FOP . 512
        FOP . 513
        FOP . 514

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      SUBROUTINE FOP          74/74   OPT=1
      READ (ITAPER,FMTA) (TITLEI(L), L=1,LTITLE)
      150 CONTINUE
      160 CONTINUE
      CALL CLUES (ITAPER,NCC,NKLUE ,KLUE )
      170 CONTINUE
      CALL FSIOFO
      CALL DSIOFO
      KANAV = KLUE( 3)
      KANAF = KLUE( 4)
      KOPTF = KLUE( 7)
      KREPOR = KLUE( 8)
      KLABEL = KLUE( 9)
      KMESAG = KLUE(10)
      KTMH = KLUE(11)
      KTSH = KLUE(12)
      KLBEI = KLUE(13)
      KTIMEI = KLUE(14)
      KPASS =KLUE(26)
      KRED =KLUE(27)
      KMASSA=KLUE(28)
      KMASSD=KLUE(29)
      KMRSO=KLUE(30)
      KMASSB=KLUE(31)
      KBALUP=KLUE(32)
      KSTRER=KLUE(33)
      KRESIZ=KLUE(34)
      KNOTP =KLUE(35)
      KIDFIX=KLUE(36)
      KFREE =KLUE(37)
      LANAV = KLUE( 3+LKLUE)
      LANAF = KLUE( 4+LKLUE)

      C
      C CHECK TO SEE THAT VIBRATION & FLUTTER MODULES ARE CALLED
      C IF FLUTTER OPTIMIZATION PACKAGE IS ENTERED.
      C
      IF (KOPTF .EQ. 2 .AND. (KANAV .NE. 2 .OR. KANAF .NE. 2)) GOTO 960
      540
      C
      NCYC = 0
      VNEW = 10000.0
      DDD = -1.0
      KLUSE = -2
      IF (KANAV .EQ. 2) KLUSE =-1
      IF (KANAV .EQ. 2 .AND. KANAF .EQ. 2) KLUSE =0
      IF (KANAV .EQ. 2 .AND. KANAF .EQ.2 .AND. KOPTF .EQ.2) KLUSE =1
      IF (KANAV .EQ. 2 .AND. KANAF .EQ. 2 .AND. KOPTF .EQ. 2 .AND.
      1 KRESIZ .EQ. 2) KLUSE=2
      KLUNAL=0
      IF (KSTRER .EQ. 2) KLUNAL=1
      IRED = KRED - 1
      IF ((KMASSA .EQ. 1) KLUMD = 1
      IF ((KMASSA .EQ. 2) KLUMD = 0
      KLUBAL = KMASSB - 1
      MORBAL=KBALUP-1
      IF ((KMASSD .EQ. 1) MSADD = 0
      IF ((KMASSD .EQ. 2) MSADD = 1
      555
      560
      570

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COMMON BLOCKS	LENGTH	MEMBERS	OPT = 1
PLAYFF	26	- BIAS N 93 IFPH 96 IUIINC 0 IUMODL 3 IFDLI 6 IUMPL 6 IUMPL 9 IFTPA 12 IUMPL 15 IFSLI 18 IUQA 21 IFOAI 24 IUPHAI	
KLUES	24	0 KLUUSE 3 KLUMM 6 NPAS 9 EPS1 12 NFIX 15 EPS2 18 IBANL 21 KLUQ	
KLUFF	1	0 KFREE 0 IT	
COLS	22	3 IDENS 6 ISRA 9 IPUTL 12 JINIT 15 JOOLD 18 JDRVCL 21 USPRA	
SIZES	6	0 NSTMM 3 NNOP 0 IBANE 3 WBOTL 0 IDIV 0 KORE 0 LKLUF 0 EMP 0 KPLOL 0 NUMSL 32 IDYDCL 72 STRWL 97 STRICL 142 STRRL 177 STRWL 212 STRRL	
BANDW	1	0 WINI	
WAYS	6	3 WBOTL	
CIDIV	1	0 IDIV	
CORE	2	0 KORE	
CLUFO	21	0 LKLUF	
PLUG	129	0 EMP	
CPLOTS	1	0 KPLOL	
CPLOTF	1	0 KPLOL	
STORES	277	0 NUMSL	
STRCLU	10	0 ICYCCL 3 M2 6 VS 9 STPOU 0 IUSTH	
LOCSTR	6	0 IUSTH	
RESIZE	44	3 IFMRRE 0 ISIZRE 41 ITESL	
ACCEL	43	0 ISTOPL 7 DINE	

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FTN4.8+577  
IUIINC (1)  
IFIINCK (1)  
IFIMDF (1)  
IUSLT1 (1)  
IFMPLI (1)  
IUPATF (1)  
IFMP1 (1)  
IUDLT (1)  
IFIQA (1)  
IUPHFA (1)  
IFPHAT (1)  
KLUNAL (1)  
KLUBAL (1)  
IDNOPT (1)  
DWMAX (1)  
D  
NYCFC (1)  
IFIIN (1)  
MORBAL (1)  
  
IMINT (1)  
IOLDT (1)  
IMINTO (1)  
NVAR (1)  
JMINT (1)  
JNEWT (1)  
JSPR1 (1)  
  
NSTDOF (1)  
NDENSNO (1)  
  
WST (1)  
WPRES (1)  
  
KOREDP (1)  
KLUF0 (20)  
PHP (120)  
  
KCONST (1)  
IDSTR (5)  
STRWN (5)  
STRRN (15)  
STRDO (15)  
STRDN (15)  
ISTEP (1)  
M3 (1)  
VOLD (1)  
  
IFSTRI (1)  
IUMOD (1)  
SCLNEW (20)  
SAVSTP (1)  
IPAR (1)  
DWOLD (5)
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SUBROUTINE FOP

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PAGE

COMMON BLOCKS	LENGTH	MEMBERS	BIAS NAME (LENGTH)	OPT = 1	FTN 4 . 8+577	85/01/23 . 08 10 44	PAGE
COMRWP	3	6 NPAGE (1)	7 ITAPET (1)		2 ITAPEP (1)		
LABELS	6	0 ITAPER (1)	1 ITAPEW (1)		1 KFLABI (1)		
		0 KFLABO (1)	1 KDLABO (1)		2 KFLABI (1)		
CSHIFT	1	3 KDLABI (1)	4 ITAPEL (1)		5 KLABEL (1)		
REPORT	1	0 SHIFT (1)					
CBYTES	1	0 KREPOR (1)					
CFILES	51	0 NBYTES (1)					
MATRIX	45	0 KFILES (1)					
FILE	21	0 ISETUP (45)					
DSRN	25	0 IPOS (20)					
CSETUP	1	0 JSETUP (25)					
CVIBRA	4	0 IOINC (1)					
		0 TOL (1)					
FS101	62	3 MINUS2 (1)	1 TOL1 (1)		2 TOL2 (1)		
FS102	20	0 LFUF (1)	1 LFUFD (1)		2 NFUF (60)		
DS101	62	0 FSIONS (20)					
DS102	20	0 LDUF (1)					
CONSTS	2	0 DSIONS (20)					
BAL	241	0 NO (1)	1 YES (1)				
		0 NMBAL (1)	1 IDBAL (20)				
		41 VMBOLD (20)	61 VMBNEW (20)				
		141 DRVMB (20)	161 DRVMB0 (20)				
		201 S2MB (20)	221 S3MB (20)				
		0 UMOD (80)	80 VMOD (80)				
FLUT	204	161 WW (1)	162 CSCL (1)		160 VF (1)		
		164 IDMODE (40)	163 NMODE (1)				
PLACES	98	0 IUINI (1)	1 IUIIN2 (1)		2 IUIOUT1 (1)		
		3 IUIOUT2 (1)	4 IUGO1 (1)		5 IUGO2 (1)		
		6 IUGO3 (1)	7 IUGO4 (1)		8 IUSCR (1)		
		9 IFSCR (1)	10 IFS1 (1)		11 IFS2 (1)		
		12 IFS3 (1)	13 IFS4 (1)		14 IUCD (1)		
		15 IUPR (1)	16 IUA (1)		17 IFA (1)		
		18 IUY (1)	19 IFY (1)		20 IUMEMN (1)		
		21 IFMEMN (1)	22 IUSTFN (1)		23 IFSTEN (1)		
		24 IUKS (1)	25 IFKS (1)		26 IUB (1)		
		27 IFB (1)	28 IUDESO (1)		29 IFDESO (1)		
		30 IUMDBI (1)	31 IFMDBI (1)		32 IUADDI (1)		
		33 IFADDI (1)	34 IUBALI (1)		35 IFBALI (1)		
		36 IUDESI (1)	37 IFDESI (1)		38 IWTI (1)		
		39 IWITI (1)	40 IUMEMO (1)		41 IFMEMO (1)		
		42 IUBT (1)	43 IFBT (1)		44 IUDESN (1)		
		45 IFDESN (1)	46 IUMD (1)		47 IFMD (1)		
		48 IUMEMF (1)	49 IFMEMF (1)		50 IFSTFO (1)		
		51 IFSTFO (1)	52 IUMDB (1)		53 IFMDB (1)		
		54 IUADD (1)	55 IFADD (1)		56 IUBAL (1)		
		57 IFBAL (1)	58 IUDESF (1)		59 IFDESF (1)		
		60 IWWT (1)	61 IFWT (1)		62 IUDUM1 (1)		
		63 IFDUM1 (1)	64 IUDUM2 (1)		65 IFDUM2 (1)		
		66 IFDUM3 (1)	67 IFDUM3 (1)		68 IUL (1)		
		69 IFL (1)	70 IUYT (1)		71 IFYT (1)		
		72 IIZ (1)	73 IFZ (1)		74 IUZR (1)		
		75 IFZR (1)	76 IULR (1)		77 IFLR (1)		
		78 IUBR (1)	79 IFBR (1)		80 IUPHTF (1)		
		81 IFPHTF (1)	82 IUMODM (1)		83 IFMODM (1)		
		84 IUMODK (1)	85 IFMODK (1)		86 IUPHT (1)		
		87 IFPH (1)	88 IUQT (1)		89 IFQ (1)		
		90 IIN (1)	91 IFA (1)		92 IUPH (1)		

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SUBROUTINE	FOP	74/74	OPT=1
STATEMENT LABELS		DEF LINE	REFERENCES
0 120	INACTIVE	399	
0 133	INACTIVE	608	605
0 135	INACTIVE	497	
0 140	INACTIVE	505	502
0 150	INACTIVE	515	513
156 160	INACTIVE	516	512
0 170	INACTIVE	518	
0 200	INACTIVE	575	
347 600		752	
360 700		657	755
376 725		710	708
404 750		711	709
405 800		741	696
415 850		763	742
415 900		764	665
423 960		779	550
425 1000		780	504
602 5010	FMT	784	511
604 5020	FMT	785	779
623 5025	FMT	788	501
LOOPS	LABEL	INDEX	
124 140	I	502 505	LENGTH
146 150	K	513 515	PROPERTIES
334 133	I	605 608	MAXFILS(1)
COMMON BLOCKS		LENGTH	MAXFILS(1)
DCOM1		16	0 MAXUNITS(1)
DCOM2		648	3 OLDOP (1)
DCOM3		6156	0 FET (648)
CTAPES		50	0 BUFFER (6156)
CLUEM		81	0 ITAPES (50)
CLUEV		81	0 LKLU (1)
CLUEF		21	0 LKLUV (1)
CTITLE		37	0 LKLUF (1)
CTMH		38	0 LTITLE (1)
CTSH		20	0 KTMH (1)
MESAG		4	0 KTSH (1)
CTFH		20	0 KMEASAG (1)
CTSHV		19	3 KTIME (1)
CTSHF		19	0 KTFH (1)
CTSHFO		19	0 LTFH (1)
CFMTA		2	0 LTSHV (1)
CFMTB		3	0 LTSHF (1)
CFMTBO		3	0 LTSHFO (1)
CFMTCO		8	0 FMTA (2)
CDATER		1	0 FMTB (3)
CEELO2		1	0 FMTBO (3)
CLIST		11	0 FMTCO (8)
			0 DATER (1)
			0 RELO2 (1)
			0 KOUNT (1)
			3 LINEST (1)
			6 NPAGE (1)
			9 KOUNTH (1)
			0 KTABLE (1)
			3 NCOLS (1)
CTABLE		8	1 KPAGE (1)
			4 KLABEL (1)
			7 KBPAGE (1)
			10 KOUNTI (1)
			1 NPASS (1)
			4 NCOLST (1)

VARIABLES	SN	TYPE	RELOCATION	
335	S3MB	REAL	ARRAY	BAL
2	TFH	REAL	ARRAY	CTFH
1	TITLE	REAL	ARRAY	CTITLE
734	TITLE1	REAL	ARRAY	REFS
2	TMH	REAL	ARRAY	REFS
0	TOL	REAL	CVIBRA	REFS
1	TOL1	REAL	CVIBRA	REFS
2	TOL2	REAL	CVIBRA	REFS
2	TSH	REAL	ARRAY	CTSH
1	TSHF	REAL	ARRAY	CTSHF
1	TSHF0	REAL	ARRAY	CTSHFO
1	TSHV	REAL	ARRAY	CTSHV
0	UMOD	COMPLEX	ARRAY	FLUT
10	VDES	REAL	FLUT	REFS
240	VF	REAL	FLUT	REFS
25	VMBIN	REAL	ARRAY	BAL
75	VMBNEW	REAL	ARRAY	REFS
51	VMBOLD	REAL	ARRAY	BAL
120	VMOD	COMPLEX	ARRAY	FLUT
10	VNEW	REAL	STRCLU	REFS
7	VOLD	REAL	STRCLU	REFS
6	VS	REAL	STRCLU	REFS
3	WBOTH	REAL	WAYTS	REFS
0	WINITT	REAL	WAYTS	REFS
2	WMB	REAL	WAYTS	REFS
4	WPRES	REAL	WAYTS	REFS
1	WST	REAL	FLUT	REFS
241	WW	REAL	FLUT	REFS
1	YES	INTEGER	CONSTS	REFS
VARIABLES USED AS FILE NAMES, SEE ABOVE				DEFINED
				436
				437
				662
				701
				2*710

EXTERNALS	TYPE	ARGS	REFERENCES
AFAM		1	699
AFOM		1	744
AVAM		1	660
CLUES		4	517
DATE		1	469
DOPEN		2	607
DSIOFO		0	520
EFOFO1		4	503
FETS		3	604
FLUTAP		3	701
FSIOFO		0	519
IVALUE		3	498
LDB		6	493
LLABEL		3	770
LTABLE		2	775
PLOT		3	710
SETUP		1	476
TFOP		0	395
TIMEB		2	508
VIBRAP		3	662
WORDS		3	420
			421
			422
			470
			490

SUBROUTINE FOP	74/74	OPT=1	FTN 4.8+577	85/01/23	08 10.44	PAGE	21
VARIABLES	SN	TYPE	RELOCATION				
4 NDESNO		INTEGER	SIZES	REFS	353		
5 NODESYS		INTEGER	ARRAY	REFS	353	752	
2 NDUF		INTEGER	DS101	REFS	258	318	
2 NDYDOF		INTEGER	SIZES	REFS	353		
14 NFIX		INTEGER	KLUES	REFS	345	709	
2 NBUF	*	INTEGER	FS101	REFS	258	316	
662 NKLESE	*	INTEGER	DEFINED	449	517	442	
655 NKLUE		INTEGER	BAL	REFS	321		
0 NMBAL		INTEGER	FLUT	REFS	323		
243 NMODE		INTEGER	KLUES	REFS	345		
21 NNN		INTEGER	SIZES	REFS	353		
3 NNOPt		INTEGER	CONSTS	REFS	320		
0 NO		INTEGER	FILE	REFS	312		
24 NOBUF		INTEGER	CLIST	REFS	301		
6 NPAGEA		INTEGER	CTABLE	REFS	303		
6 NPAS		INTEGER	KLUES	REFS	345		
1 NPASS		INTEGER	CTABLE	REFS	303		
732 NPLOTF	*	INTEGER	CTABLE	REFS	303		
731 NPLOTV	*	INTEGER	SIZES	REFS	353		
2 NROWS		INTEGER	SIZES	REFS	353		
1 NSTDOF		INTEGER	CTABLE	REFS	303		
0 NSTMEM		INTEGER	SIZES	REFS	353		
675 NTAPEI		INTEGER	STORES	REFS	493	489	
0 NUMSTR		INTEGER	COLS	REFS	370		
12 NVAR		INTEGER	DCOM1	REFS	349		
3 OLDOP		INTEGER	DCOM1	REFS	239	277	
2 OLDU		INTEGER	STORES	REFS	239	277	
677 PACAGE	*	REAL	RESIZE	REFS	378		
11 PHP		REAL	PLUG	REFS	267		
0 REELO2		REAL	CEELO2	REFS	300		
52 RILSTP		REAL	ACCEL	REFS	379		
52 SAVSTP		REAL	RESIZE	REFS	378		
362 SCALE		REAL	STORES	REFS	370		
1 SCLNEW		REAL	RESIZE	REFS	378		
25 SCOLD		REAL	RESIZE	REFS	378		
0 SHIFT		REAL	CSHIFT	REFS	307		
676 SKIP		REAL	STRCLU	REFS	375		
11 STPOLD		REAL	STORES	REFS	370		
305 STRIDN		REAL	ARRAY	STORES	REFS		
266 STRIDO		REAL	ARRAY	STORES	REFS		
122 STRII		REAL	ARRAY	STORES	REFS		
160 STRIN		REAL	ARRAY	STORES	REFS		
141 STRIO		REAL	ARRAY	STORES	REFS		
343 STRRDN		REAL	ARRAY	STORES	REFS		
324 STRRDO		REAL	ARRAY	STORES	REFS		
177 STRRI		REAL	ARRAY	STORES	REFS		
235 STRRN		REAL	ARRAY	STORES	REFS		
216 STRRO		REAL	ARRAY	STORES	REFS		
261 STRWDN		REAL	ARRAY	STORES	REFS		
254 STRWDO		REAL	ARRAY	STORES	REFS		
103 STRWI		REAL	ARRAY	STORES	REFS		
115 STRWN		REAL	ARRAY	STORES	REFS		
110 STRWO		REAL	ARRAY	STORES	REFS		
265 S1MB		REAL	ARRAY	STORES	REFS		
650 \$10LD	*	REAL	BAL	REFS	268	321	
244			ARRAY	REFS	389	389	

SUBROUTINE	FOP	74/74	OPT: 1	FTN 4.8+577	85/01/23. 08.10.44	PAGE	20
VARIABLES	SN	TYPE	RELOCATION				
2	KTIME	INTEGER	MESAG	REFS	290	DEFINED	530
3	KTIMEL	INTEGER	MESAG	REFS	290	DEFINED	507
1	KTITLE	INTEGER	MESAG	REFS	290	DEFINED	510
0	KTMH	INTEGER	CTMH	REFS	288	DEFINED	527
5	KTPAGE	INTEGER	CLIST	REFS	301	DEFINED	527
0	KTSH	INTEGER	CTSH	REFS	289	DEFINED	528
733	KWIT	INTEGER		REFS	744	DEFINED	747
705	L	INTEGER		REFS	514	DEFINED	514
725	LANAF	* INTEGER		DEFINED	544		
724	LANAV	* INTEGER		DEFINED	543		
0	LDUF	INTEGER	DSI01	REFS	318		
1	LDUFD	INTEGER	DSI01	REFS	318		
0	LFUF	INTEGER	FSI01	REFS	316		
1	LFUFD	INTEGER	FSI01	REFS	316		
2	LINES	INTEGER	CLIST	REFS	301	DEFINED	462
10	LINESG	INTEGER	CLIST	REFS	301	DEFINED	491
700	LINEST	* INTEGER	CLIST	REFS	501		
3	LKLESE	INTEGER	CLIST	REFS	449	DEFINED	441
661	LKLU	INTEGER	CLUEM	REFS	284	DEFINED	448
0	LKLUF	INTEGER	CLUEF	REFS	286	DEFINED	446
0	LKLUV	INTEGER	CLUEV	REFS	285	DEFINED	444
0	LKLUFO	INTEGER	CLUFO	REFS	366	DEFINED	451
1	LTFH	INTEGER	CTFH	REFS	291	DEFINED	459
0	LTITLE	INTEGER	CTITLE	REFS	287	DEFINED	419
667	LTITLI	INTEGER	CTMH	REFS	514	DEFINED	468
1	LTMH	INTEGER	CTSH	REFS	288	DEFINED	503
1	LTSH	INTEGER	DCOM1	REFS	289	DEFINED	457
0	LTSHF	INTEGER	CTSHF	REFS	293	DEFINED	456
0	LTSHFO	INTEGER	CTSHFO	REFS	294	DEFINED	457
0	LTSHV	INTEGER	CTSHV	REFS	292	DEFINED	455
1	MAXFILS	INTEGER	DCOM1	REFS	277	DEFINED	601
727	MAXLOC5	INTEGER	DCOM1	REFS	604	DEFINED	602
0	MAXUNTS	INTEGER	DCOM1	REFS	277	DEFINED	605
121	MBDOF	INTEGER	BAL	REFS	257		
556	MINUS	INTEGER		REFS	428	DEFINED	427
1	MINUS2	INTEGER		REFS	315	DEFINED	428
26	MORBAL	INTEGER	CVIBRA	REFS	345	DEFINED	568
672	MPOS	INTEGER	KLUES	REFS	475	DEFINED	474
5	MSADD	INTEGER	KLUES	REFS	345	DEFINED	569
671	MTAPES	INTEGER	KLUES	REFS	473	DEFINED	472
703	MTITLE	INTEGER	STRCLU	REFS	512	DEFINED	570
2	M1	INTEGER	STRCLU	REFS	375		
3	M2	INTEGER	STRCLU	REFS	375	DEFINED	383
4	M3	INTEGER	STRCLU	REFS	375	DEFINED	384
5	M4	* INTEGER	STRCLU	REFS	386		
645	M5	* INTEGER	STRCLU	REFS	387		
646	M6	* INTEGER	STRCLU	REFS	388		
647	M7	* INTEGER	STRCLU	REFS	388		
13	NBAR	INTEGER	KLUES	REFS	345		
0	NBYTES	INTEGER	CBYTES	REFS	309	DEFINED	430
665	NCC	INTEGER		REFS	517	DEFINED	453
673	NCOL	INTEGER		REFS	493	DEFINED	487
3	NCOLS	INTEGER	CTABLE	REFS	303	DEFINED	461
4	NCOLST	INTEGER	CTABLE	REFS	303	DEFINED	553
20	NCYC	INTEGER	KLUES	REFS	345	DEFINED	553

SUBROUTINE FOP		74/74 OPT=1		RELOCATION	
VARIABLES	SN	TYPE	STORES	LABELS	LABELS
1	KCONST	INTEGER			
3	KDLABI	INTEGER			
1	KDLABO	INTEGER			
702	KEOF	INTEGER			
0	KFILES	INTEGER			
2	KFLABI	INTEGER			
0	KFLABO	INTEGER			
0	KFREE	INTEGER			
674	KHEAD	INTEGER			
723	KIDFIX	INTEGER			
5	KLABEL	INTEGER			
4	KLABELI	INTEGER			
660	KLESED	INTEGER			
24	KLUB	INTEGER			
4	KLBAL	INTEGER			
1	KLUE	INTEGER	ARRAY	CLUEF	CLUEV
654	KLUED	INTEGER	ARRAY	CLUEF	CLUEV
1	KLUEF	INTEGER	ARRAY	CLUEF	CLUEV
657	KLUEFD	INTEGER	ARRAY	CLUEF	CLUEV
1	KLUEV	INTEGER	ARRAY	CLUEF	CLUEV
656	KLUEVD	INTEGER	ARRAY	CLUFO	CLUFO
1	KLUFQ	INTEGER	ARRAY	CLUFO	CLUFO
663	KLUFQD	INTEGER	ARRAY	KLUES	KLUES
3	KLUMD	INTEGER	INTEGER	KLUES	KLUES
1	KLUNAL	INTEGER	INTEGER	KLUES	KLUES
25	KLUQ	INTEGER	INTEGER	KLUES	KLUES
0	KLUE	INTEGER	INTEGER	KLUES	KLUES
713	KMASSA	INTEGER			
716	KMASSB	INTEGER			
714	KMASSD	INTEGER			
715	KMASSO	INTEGER			
0	KMESSAG	INTEGER			
722	KNOTP	INTEGER	*		
651	KOMPUT	INTEGER	*		
710	KOPTF	INTEGER			
0	KORE	INTEGER			
1	KREOP	INTEGER			
0	KOUNT	INTEGER			
11	KOUNTH	INTEGER			
12	KOUNTI	INTEGER			
1	KPAGE	INTEGER			
711	KPASS	INTEGER			
0	KPLOTF	INTEGER			
0	KPLOTS	INTEGER			
653	KPLOTV	INTEGER			
712	KRED	INTEGER			
0	KREPOR	INTEGER			
721	KRESIZ	INTEGER			
666	KROUP	INTEGER			
720	KSTRER	INTEGER			
0	KTABLE	INTEGER			
5	KTABLO	INTEGER			
0	KTFH	INTEGER			

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DEFINED 390				
DEFINED 466				
DEFINED 464				
504				
DEFINED 465	467	523	522	
DEFINED 463	463	531	530	
DEFINED 542	527	528	529	
DEFINED 488	534	535	536	
DEFINED 541	542	543	544	
DEFINED 529	498	DEFINED	440	
DEFINED 525	286	500		
DEFINED 447	500	DEFINED	445	
	285	499		
	499	DEFINED	443	
	366			
DEFINED 450	450			
DEFINED 565	565	566		
DEFINED 562	562	563		
DEFINED 566	556	557		
DEFINED 536	536	533		
DEFINED 570	571	DEFINED	534	
DEFINED 571	526	535		
DEFINED 540	540			
559	560	742	DEFINED	523
DEFINED 491	491	506		
DEFINED 662	531	2*701	710	
662	699			
DEFINED 437	437			
2*662	701	710	DEFINED	438
DEFINED 532	532			
DEFINED 524	524			
DEFINED 539	539			
DEFINED 775	DEFINED			
775	538			
DEFINED 492	492			
DEFINED 458	458			

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313		
558	559	560
557	558	559
DEFINED	481	497
DEFINED	471	491
DEFINED	537	537
DEFINED	431	431
		696
		560

SUBROUTINE	FOP	74/74	OPT=1	FTN 4.8+577	85/01/23	08 10 44	PAGE	17
VARIABLES	SN	TYPE	RELOCATION					
5	IOLDW	INTEGER	COLS	REFS	498	J9	500	DEFINED 452
664	IONE	INTEGER	ACCEL	REFS	379			
1	IPAR	INTEGER	FILE	REFS	252	312	DEFINED 475	
0	IPOS	INTEGER	KLUES	REFS	345	DEFINED 564		
2	IREQ	INTEGER	ARRAY	REFS	252	311		
0	ISETUP	INTEGER	ARRAY	REFS	378			
0	ISIZE	INTEGER	MATRIX	REFS	349			
6	ISRAT	INTEGER	RESIZE	REFS	370			
2	ISTDOF	INTEGER	COLS	REFS	375			
1	ISTEP	INTEGER	STORES	REFS	375			
0	ISTOP	INTEGER	STRCLU	REFS	379			
0	IT	INTEGER	ACCEL	REFS	349			
4	ITAPEL	INTEGER	COLS	REFS	306	DEFINED 483		
2	ITAPEP	INTEGER	LABELS	REFS	305	DEFINED 479		
0	ITAPER	INTEGER	CMRWP	REFS	305	480	493	503 517
0	ITAPES	INTEGER	CMRWP	REFS	305	480	501	514
7	ITAPET	INTEGER	DEFINED	477	1/O REFS	478	479	482 483
1	ITAPEW	INTEGER	ARRAY	CTAPES	REFS	283	477	
0			CTABLE	REFS	473			
730	ITAPO2	*	CMRWP	REFS	303	DEFINED 482		
51	ITEST0	INTEGER	DEFINED	478	1/O REFS	770	775	
20	IUA	INTEGER	RESIZE	REFS	617			
66	IUADD	INTEGER	PLACES	REFS	378			
40	IUADDI	INTEGER	PLACES	REFS	324			
32	IUB	INTEGER	PLACES	REFS	324			
70	IUBAL	INTEGER	PLACES	REFS	324			
42	IUBALI	INTEGER	PLACES	REFS	324			
116	IUBR	INTEGER	PLACES	REFS	324			
52	IUBT	INTEGER	PLACES	REFS	324			
16	IUCD	INTEGER	PLACES	REFS	324			
72	IUDESF	INTEGER	PLACES	REFS	324			
44	IUDESI	INTEGER	PLACES	REFS	324			
54	IUDESN	INTEGER	PLACES	REFS	324			
34	IUDESO	INTEGER	PLACES	REFS	324			
20	IUDLT	INTEGER	PLAYFF	REFS	324			
2	IUDLT1	INTEGER	PLAYFF	REFS	324			
76	IUDUM1	INTEGER	PLAYFF	REFS	324			
100	IUDUM2	INTEGER	PLAYFF	REFS	324			
102	IUDUM3	INTEGER	PLAYFF	REFS	324			
4	IUGO1	INTEGER	PLAYFF	REFS	324			
5	IUGO2	INTEGER	PLAYFF	REFS	324			
6	IUGO3	INTEGER	PLAYFF	REFS	324			
7	IUGO4	INTEGER	PLAYFF	REFS	324			
140	IUINCK	INTEGER	PLAYFF	REFS	324			
136	IUINCM	INTEGER	PLAYFF	REFS	324			
0	IUIN1	INTEGER	PLAYFF	REFS	324			
1	IUIN2	INTEGER	PLAYFF	REFS	324			
30	IUKS	INTEGER	PLAYFF	REFS	324			
104	IUL	INTEGER	PLAYFF	REFS	324			
114	IULR	INTEGER	PLAYFF	REFS	324			
56	IUMD	INTEGER	PLAYFF	REFS	324			
64	IUMDB	INTEGER	PLAYFF	REFS	324			
36	IUMDB1	INTEGER	PLAYFF	REFS	324			
0	IUMDBF	INTEGER	PLAYFF	REFS	341			
60	TIMEMF		PLAYFF	REFS	324			

VARIABLES	SN	TYPE	RELOCATION	
77 IFDUM1	101	INTEGER	PLACES	REFS 324
101 IFDUM2	103	INTEGER	PLACES	REFS 324
103 IFDUM3	1	INTEGER	PLACES	REFS 324
1 IFILES	23	INTEGER	CFILES	REFS 252
23 IFIN	141	INTEGER	KLUES	REFS 345
141 IFINCK	137	INTEGER	PLACES	REFS 324
137 IFINCM	31	INTEGER	PLACES	REFS 324
31 IFKS	105	INTEGER	PLACES	REFS 324
105 IFL	115	INTEGER	PLACES	REFS 324
115 IFLR	57	IFMEMF	PLACES	REFS 324
57 IFMC	65	IFMEMO	PLACES	REFS 324
65 IFMDB	37	IFMDB1	PLACES	REFS 324
37 IFMOD	5	IFMOD	LOCSTR	REFS 376
5 IFMREF	125	IFMODK	PLAYFF	REFS 341
125 IFMODM	123	IFMPL	PLAYFF	REFS 324
123 IFMPL	15	IFMPLI	PLAYFF	REFS 324
15 IFMPLI	7	IFMPHAT	PLAYFF	REFS 341
7 IFMPHAT	3	IFMRH	PLAYFF	REFS 324
3 IFMRH	13	IFPATF	PLAYFF	REFS 324
13 IFPATF	135	IFPH	PLAYFF	REFS 324
135 IFQ	27	IFPHA	PLAYFF	REFS 341
27 IFQAHAT	31	IFPHAT	PLAYFF	REFS 341
31 IFPHAT	127	IFPHT	PLAYFF	REFS 324
127 IFPHT	121	IFPHTF	PLAYFF	REFS 324
121 IFPHTF	133	IFQ	PLAYFF	REFS 324
133 IFSLT	23	IFQA	PLAYFF	REFS 341
23 IFQAT	25	IFQL	PLAYFF	REFS 341
25 IFQL	131	IFQT	PLAYFF	REFS 324
131 IFQT	11	IFSCK	PLAYFF	REFS 324
11 IFSCK	17	IFSCT	PLAYFF	REFS 324
17 IFSCT	5	IFSLTI	PLAYFF	REFS 341
5 IFSLTI	27	IFSTFN	PLAYFF	REFS 324
27 IFSTFN	63	IFSTFO	PLAYFF	REFS 324
63 IFSTFO	1	IFSTRI	LOCSTR	REFS 376
1 IFSTRI	12	IFS1	PLAYFF	REFS 324
12 IFS1	13	IFS2	PLAYFF	REFS 324
13 IFS2	14	IFS3	PLAYFF	REFS 324
14 IFS3	15	IFS4	PLAYFF	REFS 324
15 IFS4	11	IFTPGT	PLAYFF	REFS 341
11 IFTPGT	75	IFWT	PLAYFF	REFS 324
75 IFWT	47	IFWT1	PLAYFF	REFS 324
47 IFWT1	23	IFY	PLAYFF	REFS 324
23 IGY	107	IFYT	PLAYFF	REFS 324
107 IGYT	111	IFZ	PLAYFF	REFS 324
111 IFZ	113	IFZR	PLAYFF	REFS 324
113 IFZR	643	IIII	*	DEFINED 382
643 IIII	10	INITT	COLS	REFS 349
10 INITT	2	IMAXT	COLS	REFS 349
2 IMAXT	1	IMINT	COLS	REFS 349
1 IMINT	7	IMINTO	COLS	REFS 349
7 IMINTO	0	IOINC	CSETUP	REFS 314
0 IOINC	4	IOLDT	COLS	REFS 349

DEFINED 429

ENTRY POINTS	SUBROUTINE FOP	DEF LINE	74/74 OPT=1	REFERENCES
1	FOP	225	790	
VARIABLES	SN	TYPE	RELOCATION	
0	BUFFER	INTEGER	ARRAY DCOM3	REFS 239
4	BUFSZ	INTEGER	ARRAY DCOM1	REFS 239
642	BUFSZD	REAL	FLUT	REFS 239
242	CSCL	REAL	KLUES	REFS 323
15	D	REAL	CDATE	REFS 345
0	DATER	REAL	KLUES	REFS 299
27	DBAL	REAL	KLUES	REFS 345
726	DDD	* REAL	DEFINED	555
16	DEL	REAL	KLUES	REFS 345
7	DINEW	REAL	ACCEL	REFS 379
33	DIOLD	REAL	ACCEL	REFS 379
215	DRVMB	REAL	BAL	REFS 245
241	DRVMB0	REAL	ARRAY DS102	REFS 245
0	DSIONS	REAL	ARRAY DS102	REFS 250
5	DW	REAL	WAYS	REFS 363
12	DWMAX	REAL	KLUES	REFS 345
2	DWNEW	REAL	ACCEL	REFS 379
26	DWOLD	REAL	ACCEL	REFS 379
0	EMP	REAL	PLUG	REFS 246
11	EPS1	REAL	KLUES	REFS 345
17	EPS2	REAL	KLUES	REFS 345
0	FET	INTEGER	ARRAY DCOM2	REFS 239
0	FMTA	REAL	CFMTA	REFS 247
0	FMTB	REAL	CFMTB	REFS 247
0	FMTBO	REAL	CFMTBO	REFS 247
0	FMTCO	REAL	CFMTCO	REFS 247
0	FSI0NS	REAL	ARRAY FS102	REFS 247
701	I	INTEGER	KLUES	REFS 503
22	IBAND	INTEGER	BANDW	REFS 345
0	IBANDW	INTEGER	STRCLU	REFS 362
0	ICYCLE	INTEGER	BAL	REFS 375
1	IDBAL	INTEGER	COLS	REFS 251
3	IDENS	INTEGER	CIDIV	REFS 349
0	IDIV	INTEGER	FLUT	REFS 364
244	IDMODE	INTEGER	KLUES	REFS 273
7	IDNOPT	INTEGER	STORES	REFS 345
76	IDSTR	INTEGER	RESIZE	REFS 370
53	IDUB	INTEGER	STORES	REFS 370
40	IDYOFF	INTEGER	ARRAY PLACES	REFS 324
21	IFA	INTEGER	PLACES	REFS 324
67	IFADD	INTEGER	PLACES	REFS 324
41	IFADDI	INTEGER	PLACES	REFS 324
33	IFB	INTEGER	PLACES	REFS 324
71	IFBAL	INTEGER	PLACES	REFS 324
43	IFBALI	INTEGER	PLACES	REFS 324
117	IFBR	INTEGER	PLACES	REFS 324
53	IFBT	INTEGER	PLAYFF	REFS 324
73	IFDEF	INTEGER	PLAYFF	REFS 324
45	IFDESI	INTEGER	PLAYFF	REFS 324
55	IFDESN	INTEGER	PLAYFF	REFS 324
35	IFDESO	INTEGER	PLAYFF	REFS 324
21	IFDLT	INTEGER	PLAYFF	REFS 341
3	IFDLTI	INTEGER	PLAYFF	REFS 341

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LINE NUMBER	ROUTINE	OPTION	FUNCTION	LAST LINE	PAGE
685	SUBROUTINE FOP	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44
690	C AUTOMATED FLUTTER ANALYSIS MODULE			FOP 686	13
695	C CALL FLUTTER PACKAGE.			FOP 687	
700	C 1. COMPUTE FLUTTER SPEED, VF, AND FLUTTER FREQ. (SQ),WW.			FOP 688	
705	C 2. IF KLUSE=1 OR 2 ALSO COMPUTE MODAL VECTORS, UMOD AND VMOD,			FOP 689	
710	C AND THE AERO DERIVATIVE SCALAR, CSCL.			FOP 690	
715	C 700 CONTINUE			FOP 691	
720	C IF (KANAF .EQ. 1) GOTO 800			FOP 692	
725	C NPASS = NPASS + 1			FOP 693	
730	C CALL AFAM (KPLOTF)			FOP 694	
735	C IF (KPLOTF .EQ. YES) CALL FLUTAP (KPLOTV,KPLOTF,NPLOTF)			FOP 695	
740	C CIBM IF (KPLOTF.EQ.YES.OR.KPLOTV.EQ.YES) CALL PLOT(O.,O.,999)			FOP 696	
745	C CIBM IF (KPLOTF.EQ.YES.OR.KPLOTV.EQ.YES) CALL PLOT(O.,O.,999)			FOP 697	
750	C CCDC IF (KLUE(7).EQ.1) GO TO 725			FOP 698	
755	C IF (NCYC.EQ.0.OR.NCYC.LT.NFIX) GO TO 750			FOP 699	
760	C IF (KPLOTF.EQ.YES.OR.KPLOTV.EQ.YES) CALL PLOT(O.,O.,999)			FOP 700	
765	C 750 CONTINUE			FOP 701	
770	C CCDC IF (IFIN.EQ.0) GO TO 900			FOP 702	
775	C ****			FOP 703	
780	C ****			FOP 704	
785	C ****			FOP 705	
790	C ****			FOP 706	
795	C ****			FOP 707	
800	C ****			FOP 708	
805	C ****			FOP 709	
810	C ****			FOP 710	
815	C ****			FOP 711	
820	C ****			FOP 712	
825	C ****			FOP 713	
830	C ****			FOP 714	
835	C ****			FOP 715	
840	C ****			FOP 716	
845	C ****			FOP 717	
850	C ****			FOP 718	
855	C ****			FOP 719	
860	C ****			FOP 720	
865	C ****			FOP 721	
870	C ****			FOP 722	
875	C ****			FOP 723	
880	C ****			FOP 724	
885	C ****			FOP 725	
890	C ****			FOP 726	
895	C ****			FOP 727	
900	C ****			FOP 728	
905	C ****			FOP 729	
910	C ****			FOP 730	
915	C ****			FOP 731	
920	C ****			FOP 732	
925	C ****			FOP 733	
930	C ****			FOP 734	
935	C ****			FOP 735	
940	C ****			FOP 736	
945	C ****			FOP 737	
950	C CALL SUBROUTINE AFOM TO COMPUTE FLUTTER DERIVATIVES, REDESIGN THE			FOP 738	
955	C STRUCTURE, ETC.			FOP 739	
960	C 800 CONTINUE			FOP 740	

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SUBROUTINE FOP      74/74   OPT=1          FTN 4.8+577    85/01/23. 08.10.44   PAGE
C*****          A   A   V V   A   A   M M M   ****   FOP 629
C*****          A   A   V   A   A   M M M   ****   FOP 630
C*****          A   A   V   A   A   M M M   ****   FOP 631
C*****          A   A   V   A   A   M M M   ****   FOP 632
C*****          A   A   V   A   A   M M M   ****   FOP 633
C*****          A   A   V   A   A   M M M   ****   FOP 634
C*****          A   A   V   A   A   M M M   ****   FOP 635
C*****          A   A   V   A   A   M M M   ****   FOP 636
C*****          A   A   V   A   A   M M M   ****   FOP 637
C*****          A   A   V   A   A   M M M   ****   FOP 638
C*****          A   A   V   A   A   M M M   ****   FOP 639
C*****          A   A   V   A   A   M M M   ****   FOP 640
C CALL THE VIBRATION PACKAGE. FIVE UNITS ARE AVAILABLE.
C
C A. UNIT IUN1(TAPE) CONTAINS A (OR KS, IF IRED=0) AS FIRST FILE.
C B. UNIT IUN2 CONTAINS SCRATCH FILE IFSCR IS AVAILABLE.
C C. UNIT IUGO2 CONTAINS MD AS FILE IFS2. WHEN MD IS NO LONGER NEEDED,
C THIS FILE CAN BE USED AS SCRATCH SPACE.
C C. UNITS IUGO1,IUGO3 AND IUGO4 HAVE SCRATCH SPACE ON FILES IFS1, IFS3
C AND IFS4, RESPECTIVELY.
C
C OUTPUT- MODAL MATRIX PHTF OCCUPIES FILE IFS4 ON UNIT IUGO4.
C MODAL MASS,MODM, IS PUT ON FILE IFS1 OF UNIT IUGO1. THIS IS
C FOLLOWED BY FILE FOR MODAL STIFFNESS, MODK.
C IN ADDITION, ONE FORTRAN FILE IS PROVIDED FOR THE FLUTTER
C PROGRAM. THIS FILE CONTAINS FREQUENCIES, MODAL MASS AND THE
C REDUCED MODAL MATRIX.
C
C IF (KANAV .EQ. 1) GOTO 700
C 600 CONTINUE
C
C CALL AVAM (KPLOTV)
C
C IF(KPLOTV.EQ.YES) CALL VIBRAP(KPLOTV,KPLOTF,NPLOTV)
C
C NPASS = NPASS - 1
C IF(IFIN.EQ.-1) GO TO 900
C
C*****          AAA   FFFFFF   AAA   M   M   ****   FOP 655
C*****          A   A   F   A   A   MM   MM   ****   FOP 656
C*****          AAAAAA - FFFF - AAAAAA M   M   M   ****   FOP 657
C*****          A   A   F   A   A   M   M   M   ****   FOP 658
C*****          A   A   F   A   A   M   M   M   ****   FOP 659
C*****          A   A   F   A   A   M   M   M   ****   FOP 660
C*****          A   A   F   A   A   M   M   M   ****   FOP 661
C*****          A   A   F   A   A   M   M   M   ****   FOP 662
C*****          A   A   F   A   A   M   M   M   ****   FOP 663
C*****          A   A   F   A   A   M   M   M   ****   FOP 664
C*****          A   A   F   A   A   M   M   M   ****   FOP 665
C*****          A   A   F   A   A   M   M   M   ****   FOP 666
C*****          A   A   F   A   A   M   M   M   ****   FOP 667
C*****          A   A   F   A   A   M   M   M   ****   FOP 668
C*****          A   A   F   A   A   M   M   M   ****   FOP 669
C*****          A   A   F   A   A   M   M   M   ****   FOP 670
C*****          A   A   F   A   A   M   M   M   ****   FOP 671
C*****          A   A   F   A   A   M   M   M   ****   FOP 672
C*****          A   A   F   A   A   M   M   M   ****   FOP 673
C*****          A   A   F   A   A   M   M   M   ****   FOP 674
C*****          A   A   F   A   A   MM   MM   ****   FOP 675
C*****          A   A   F   A   A   M   M   M   ****   FOP 676
C*****          A   A   F   A   A   M   M   M   ****   FOP 677
C*****          A   A   F   A   A   M   M   M   ****   FOP 678
C*****          A   A   F   A   A   M   M   M   ****   FOP 679
C*****          A   A   F   A   A   M   M   M   ****   FOP 680
C*****          A   A   F   A   A   M   M   M   ****   FOP 681
C*****          A   A   F   A   A   M   M   M   ****   FOP 682
C*****          A   A   F   A   A   M   M   M   ****   FOP 683
C*****          A   A   F   A   A   M   M   M   ****   FOP 684
C*****          A   A   F   A   A   M   M   M   ****   FOP 685

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SUBROUTINE FO; 74/74 OPT=1  
STATISTICS  
PROGRAM LENGTH 1002B 514  
CM LABELED COMMON LENGTH 20767B 8695  
52000B CM USED

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SUBROUTINE	ROUTINE	74/74	OPT=1	FTN 4.8+577	85/01/23. 08. 10. 44	PAGE
60	WRIT	( ITAPEW, 125)		TFOP	59	
	WRIT	( ITAPEW, 130)		TFOP	60	
	WRIT	( ITAPEW, 135)		TFOP	61	
	WRIT	( ITAPEW, 140)		TFOP	62	
	WRIT	( ITAPEW, 145)		TFOP	63	
	WRIT	( ITAPEW, 150)		TFOP	64	
	WRIT	( ITAPEW, 155)		TFOP	65	
	WRIT	( ITAPEW, 160)		TFOP	66	
65	WRIT	( ITAPEW, 165)		TFOP	67	
	WRIT	( ITAPEW, 170)		TFOP	68	
	WRIT	( ITAPEW, 175)		TFOP	69	
	100 FORMAT (			TFOP	70	
	* 5X, 122(1H*)			TFOP	71	
	* ./, 5X, 1H*, 120X, 1H*			TFOP	72	
	* ./, 5X, 1H*, 15X			TFOP	73	
	F, 13HFFFFFFFFFFFFF			TFOP	74	
	* 52X, 36H,			TFOP	75	
	* ./, 5X, 1H*, 15X			TFOP	76	
	F, 13HFFFFFFFFFFFFF			TFOP	77	
	* 52X, 36H,			TFOP	78	
	* ./, 5X, 1H*, 15X			TFOP	79	
70	F, 13H FFF FFF			TFOP	80	
	* 52X, 36H.			TFOP	81	
	* ./, 5X, 1H*, 15X			TFOP	82	
	F, 13H FFF FFF			TFOP	83	
	* 52X, 36H.			TFOP	84	
	* ./, 5X, 1H*, 15X			TFOP	85	
75	F, 13H FFF			TFOP	86	
	* 52X, 36H.			TFOP	87	
	* ./, 5X, 1H*, 15X			TFOP	88	
	F, 13H FFF			TFOP	89	
80	105 FORMAT (			TFOP	90	
	* 5X, 1H*, 15X			TFOP	91	
	* 52X, 36H.			TFOP	92	
	* ./, 5X, 1H*, 15X			TFOP	93	
	F, 13H FFF			TFOP	94	
	* 52X, 36H.			TFOP	95	
	* ./, 5X, 1H*, 15X			TFOP	96	
	F, 13H FFF			TFOP	97	
	* 52X, 36H.			TFOP	98	
	* ./, 5X, 1H*, 15X			TFOP	99	
85	105 FORMAT (			TFOP	100	
	* 5X, 1H*, 15X			TFOP	101	
	* 52X, 36H.			TFOP	102	
	* ./, 5X, 1H*, 15X			TFOP	103	
	F, 13H FFF			TFOP	104	
	* 52X, 36H.			TFOP	105	
	* ./, 5X, 1H*, 15X			TFOP	106	
90	105 FORMAT (			TFOP	107	
	* 5X, 1H*, 15X			TFOP	108	
	* 52X, 36H.			TFOP	109	
	* ./, 5X, 1H*, 15X			TFOP	110	
	F, 13H FFF			TFOP	111	
	* 52X, 36H.			TFOP	112	
	* ./, 5X, 1H*, 15X			TFOP	113	
95	105 FORMAT (			TFOP	114	
	* 5X, 1H*, 15X			TFOP	115	
	* 52X, 36H.			TFOP	116	
	* ./, 5X, 1H*, 15X			TFOP	117	
	F, 13H FFF			TFOP	118	
	* 52X, 36H.			TFOP	119	
100	105 FORMAT (			TFOP	120	
	* 5X, 1H*, 15X			TFOP	121	
	* 52X, 36H.			TFOP	122	
	* ./, 5X, 1H*, 15X			TFOP	123	
	F, 13H FFF			TFOP	124	
	* 52X, 36H.			TFOP	125	
105	105 FORMAT (			TFOP	126	
	* 5X, 1H*, 15X			TFOP	127	
	* 52X, 36H.			TFOP	128	
	* ./, 5X, 1H*, 15X			TFOP	129	
	F, 13H FFF			TFOP	130	
	* 52X, 36H.			TFOP	131	
110	105 FORMAT (			TFOP	132	
	* 5X, 1H*, 15X			TFOP	133	
	* 52X, 36H.			TFOP	134	
	* ./, 5X, 1H*, 15X			TFOP	135	
	F, 13H FFF			TFOP	136	
	* 52X, 36H.			TFOP	137	
	* ./, 5X, 1H*, 15X			TFOP	138	
	F, 13H FFF			TFOP	139	
	* 52X, 36H.			TFOP	140	
	* ./, 5X, 1H*, 15X			TFOP	141	
	F, 13H FFF			TFOP	142	
	* 52X, 36H.			TFOP	143	
	* ./, 5X, 1H*, 15X			TFOP	144	
	F, 13H FFF			TFOP	145	
	* 52X, 36H.			TFOP	146	
	* ./, 5X, 1H*, 15X			TFOP	147	
	F, 13H FFF			TFOP	148	
	* 52X, 36H.			TFOP	149	
	* ./, 5X, 1H*, 15X			TFOP	150	
	F, 13H FFF			TFOP	151	
	* 52X, 36H.			TFOP	152	
	* ./, 5X, 1H*, 15X			TFOP	153	
	F, 13H FFF			TFOP	154	
	* 52X, 36H.			TFOP	155	
	* ./, 5X, 1H*, 15X			TFOP	156	
	F, 13H FFF			TFOP	157	
	* 52X, 36H.			TFOP	158	
	* ./, 5X, 1H*, 15X			TFOP	159	
	F, 13H FFF			TFOP	160	
	* 52X, 36H.			TFOP	161	
	* ./, 5X, 1H*, 15X			TFOP	162	
	F, 13H FFF			TFOP	163	
	* 52X, 36H.			TFOP	164	
	* ./, 5X, 1H*, 15X			TFOP	165	
	F, 13H FFF			TFOP	166	
	* 52X, 36H.			TFOP	167	
	* ./, 5X, 1H*, 15X			TFOP	168	
	F, 13H FFF			TFOP	169	
	* 52X, 36H.			TFOP	170	
	* ./, 5X, 1H*, 15X			TFOP	171	
	F, 13H FFF			TFOP	172	
	* 52X, 36H.			TFOP	173	
	* ./, 5X, 1H*, 15X			TFOP	174	
	F, 13H FFF			TFOP	175	
	* 52X, 36H.			TFOP	176	
	* ./, 5X, 1H*, 15X			TFOP	177	
	F, 13H FFF			TFOP	178	
	* 52X, 36H.			TFOP	179	
	* ./, 5X, 1H*, 15X			TFOP	180	
	F, 13H FFF			TFOP	181	
	* 52X, 36H.			TFOP	182	
	* ./, 5X, 1H*, 15X			TFOP	183	
	F, 13H FFF			TFOP	184	
	* 52X, 36H.			TFOP	185	
	* ./, 5X, 1H*, 15X			TFOP	186	
	F, 13H FFF			TFOP	187	
	* 52X, 36H.			TFOP	188	
	* ./, 5X, 1H*, 15X			TFOP	189	
	F, 13H FFF			TFOP	190	
	* 52X, 36H.			TFOP	191	
	* ./, 5X, 1H*, 15X			TFOP	192	
	F, 13H FFF			TFOP	193	
	* 52X, 36H.			TFOP	194	
	* ./, 5X, 1H*, 15X			TFOP	195	
	F, 13H FFF			TFOP	196	
	* 52X, 36H.			TFOP	197	
	* ./, 5X, 1H*, 15X			TFOP	198	
	F, 13H FFF			TFOP	199	
	* 52X, 36H.			TFOP	200	
	* ./, 5X, 1H*, 15X			TFOP	201	
	F, 13H FFF			TFOP	202	
	* 52X, 36H.			TFOP	203	
	* ./, 5X, 1H*, 15X			TFOP	204	
	F, 13H FFF			TFOP	205	
	* 52X, 36H.			TFOP	206	
	* ./, 5X, 1H*, 15X			TFOP	207	
	F, 13H FFF			TFOP	208	
	* 52X, 36H.			TFOP	209	
	* ./, 5X, 1H*, 15X			TFOP	210	
	F, 13H FFF			TFOP	211	
	* 52X, 36H.			TFOP	212	
	* ./, 5X, 1H*, 15X			TFOP	213	
	F, 13H FFF			TFOP	214	
	* 52X, 36H.			TFOP	215	
	* ./, 5X, 1H*, 15X			TFOP	216	
	F, 13H FFF			TFOP	217	
	* 52X, 36H.			TFOP	218	
	* ./, 5X, 1H*, 15X			TFOP	219	
	F, 13H FFF			TFOP	220	
	* 52X, 36H.			TFOP	221	
	* ./, 5X, 1H*, 15X			TFOP	222	
	F, 13H FFF			TFOP	223	
	* 52X, 36H.			TFOP	224	
	* ./, 5X, 1H*, 15X			TFOP	225	
	F, 13H FFF			TFOP	226	
	* 52X, 36H.			TFOP	227	
	* ./, 5X, 1H*, 15X			TFOP	228	
	F, 13H FFF			TFOP	229	
	* 52X, 36H.			TFOP	230	
	* ./, 5X, 1H*, 15X			TFOP	231	
	F, 13H FFF			TFOP	232	
	* 52X, 36H.			TFOP	233	
	* ./, 5X, 1H*, 15X			TFOP	234	
	F, 13H FFF			TFOP	235	
	* 52X, 36H.			TFOP	236	
	* ./, 5X, 1H*, 15X			TFOP	237	
	F, 13H FFF			TFOP	238	
	* 52X, 36H.			TFOP	239	
	* ./, 5X, 1H*, 15X			TFOP	240	
	F, 13H FFF			TFOP	241	
	* 52X, 36H.			TFOP	242	
	* ./, 5X, 1H*, 15X			TFOP	243	
	F, 13H FFF			TFOP	244	
	* 52X, 36H.			TFOP	245	
	* ./, 5X, 1H*, 15X			TFOP	246	
	F, 13H FFF			TFOP	247	
	* 52X, 36H.			TFOP	248	
	* ./, 5X, 1H*, 15X			TFOP	249	
	F, 13H FFF			TFOP	250	
	* 52X, 36H.			TFOP	251	
	* ./, 5X, 1H*, 15X			TFOP	252	
	F, 13H FFF			TFOP	253	
	* 52X, 36H.			TFOP	254	
	* ./, 5X, 1H*, 15X			TFOP	255	
	F, 13H FFF			TFOP	256	
	* 52X, 36H.			TFOP	257	
	* ./, 5X, 1H*, 15X			TFOP	258	
	F, 13H FFF			TFOP	259	
	* 52X, 36H.			TFOP	260	
	* ./, 5X, 1H*, 15X			TFOP	261	
	F, 13H FFF			TFOP	262	
	* 52X, 36H.			TFOP	263	
	* ./, 5X, 1H*, 15X			TFOP	264	
	F, 13H FFF			TFOP	265	
	* 52X, 36H.			TFOP	266	
	* ./, 5X, 1H*, 15X			TFOP	267	
	F, 13H FFF			TFOP	268	
	* 52X, 36H.			TFOP	269	
	* ./, 5X, 1H*, 15X			TFOP	270	
	F, 13H FFF			TFOP	271	
	* 52X, 36H.			TFOP	272	
	* ./, 5X, 1H*, 15X			TFOP	273	
	F, 13H FFF			TFOP	274	
	* 52X, 36H.			TFOP	275	
	* ./, 5X, 1H*, 15X			TFOP	276	
	F, 13H FFF			TFOP	277	
	* 52X, 36H.			TFOP	278	
	* ./, 5X, 1H*, 15X			TFOP	279	
	F, 13H FFF			TFOP	280	
	* 52X, 36H.			TFOP	281	
	* ./, 5X, 1H*, 15X			TFOP	282	
	F, 13H FFF			TFOP	283	
	* 52X, 36H.			TFOP	284	
	* ./, 5X, 1H*, 15X			TFOP	285	
	F, 13H FFF			TFOP	286	
	* 52X, 36H.			TFOP	287	
	* ./, 5X, 1H*, 15X			TFOP	288	
	F, 13H FFF			TFOP	289	
	* 52X, 36H.			TFOP	290	
	* ./, 5X, 1H*, 15X			TFOP	291	
	F, 13H FFF			TFOP	292	
	* 52X, 36H.			TFOP	293	
	* ./, 5X, 1H*, 15X			TFOP	294	
	F, 13H FFF			TFOP	295	
	* 52X, 36H.			TFOP	296	
	* ./, 5X, 1H*, 15X			TFOP	297	
	F,					

SUBROUTINE	TFOP	74/74	OPT=1	FTN 4.8+577	85/01/23. 08, 10, 44	PAGE	3
115		* 26X, 36H.	FLIGHT DYNAMICS LABORATORY	..,4X, 1H*)			
	115 FORMAT (						
	* 5X, 1H*, 15X						
	F, 13H FFF						
	* 52X, 36H.						
	* 52X, 15X						
	F, 13H FFF						
	* /, 5X, 1H*, 15X						
	* 52X, 10H.						
	* /, 5X, 1H*, 15X						
	F, 13H FFF						
	* 26X						
	0, 13H 0000000						
	* 13X, 36H.						
	120 FORMAT (						
	* 5X, 1H*, 15X						
	F, 13H FFF						
	* 26X						
	0, 13H 000000000						
	* 13X, 36H.						
	120 FORMAT (						
	* 5X, 1H*, 15X						
	F, 13H FFF						
	* 26X						
	0, 13H 0000 0000						
	* 53X, 1H*						
	* /, 5X, 1H*, 15X						
	F, 13HFFFF						
	* 26X						
	0, 13H000 000						
	* 53X, 1H*)						
	125 FORMAT (						
	* 5X, 1H*, 15X						
	F, 13HFFFF						
	* 26X						
	0, 13H000 000						
	* 53X, 1H*						
	* /, 5X, 1H*, 54X						
	0, 13H000 000						
	* 53X, 1H*						
	* /, 5X, 1H*, 54X						
	0, 13H000 000						
	* 53X, 1H*						
	* /, 5X, 1H*, 54X						
	0, 13H000 000						
	* 53X, 1H*)						
	130 FORMAT (						
	* 5X, 1H*, 54X						
	0, 13H000 000						
	* 53X, 1H*						
	* /, 5X, 1H*, 54X						
	0, 13H000 000						
	* 53X, 1H*)						
	135 FORMAT (						
	* 5X, 1H*, 54X						
	0, 13H000 000						
	* 53X, 1H*						
	* /, 5X, 1H*, 54X						
	0, 13H000 000						
	* 53X, 1H*)						
	170						

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SUBROUTINE TFOP      74/74      OPT-1

        * .53X, 1H*
        * ./ 5X, 1H* .54X
        * 0, 13H000     000
        * .53X, 1H* )
140 FORMAT ((
        * 5X, 1H*, .54X
        0, 13H000     000
        * .53X, 1H*
        * ./ 5X, 1H* .54X
        0, 13H000     000
        * .53X, 1H*
        * ./ 5X, 1H* .54X
        0, 13H000     000
        * .26X
P, 13HPPPPPPPPPPP
        * 14X, 1H* )
145 FORMAT (
        * 5X, 1H*, .54X
        0, 13H000     000
        * .26X
P, 13HPPPPPPPPPPP
        * 14X, 1H*
        * ./ 5X, 1H* .54X
        0, 13H 0000    0000
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H* .54X
        0, 13H 00000000
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
150 FORMAT (
        * 5X, 1H*, .54X
        0, 13H 00000000
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H* .93X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
155 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
165 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
175 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
180 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
185 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
190 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
195 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
200 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
205 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
210 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
215 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
220 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )
225 FORMAT (
        * 5X, 1H*, 2X
        * .8(3HGGG), 40HGGGGG
        * .26X
P, 13H PPP     PPP
        * 14X, 1H*
        * ./ 5X, 1H*, 2X
        * .24X,
        * .26X
P, 13H PPP     PPP
        * 14X, 1H* )

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TFOP	173		
TFOP	174		
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TFOP	229		
GGG	.1X		

SUBROUTINE	TFOP	74/74	GPT=1	FTN 4.8+577	85/01/23	08.10.44	PAGE	5
230	*	/ . 5X, 1H*, 2X	4OH	GGGGGGGGGGGGGGGGGGGG		, 1X	TFOP	230
	*	24X,					TFOP	231
	*	26X					TFOP	232
	P.	13H PPPPPPPP					TFOP	233
	*	14X, 1H*)					TFOP	234
160	FORMAT (						TFOP	235
	*	5X, 1H*, 2X					TFOP	236
	*	5X, 15H					TFOP	237
	*		4OH	GGGGGGGGGGGGGGGGGG		, 1X	TFOP	238
	*	26X					TFOP	239
	P.	13H PPPPPPPP					TFOP	240
	*	14X, 1H*					TFOP	241
240	*	/ . 5X, 1H*, 2X					TFOP	242
	*	5X, 15H					TFOP	243
	*		4OH	GGGGGGGGGGGGGGGGGG		, 1X	TFOP	244
	*	26X					TFOP	245
	P.	13H PPP					TFOP	246
	*	14X, 1H*					TFOP	247
245	*	/ . 5X, 1H*, 2X					TFOP	248
	*	5X, 15H					TFOP	249
	*		4OH	GRUMMAN		, 1X	TFOP	250
	*	26X					TFOP	251
	P.	13H PPP					TFOP	252
	*	14X, 1H*)					TFOP	253
165	FORMAT (						TFOP	254
	*	5X, 1H*, 2X					TFOP	255
	*	5X, 15H					TFOP	256
255	*		4OH	AEROSPACE		, 1X	TFOP	257
	*	26X					TFOP	258
	P.	13H PPP					TFOP	259
	*	14X, 1H*					TFOP	260
250	*	/ . 5X, 1H*, 2X					TFOP	261
	*	5X, 15H					TFOP	262
	*		4OH	CORPORATION		, 1X	TFOP	263
	*	26X					TFOP	264
	P.	13H PPP					TFOP	265
	*	14X, 1H*					TFOP	266
260	*	/ . 5X, 1H*, 2X					TFOP	267
	*	5X, 15H					TFOP	268
	*		4OH	GGGGGGGGGG		, 1X	TFOP	269
	*	26X					TFOP	270
	P.	13H PPP					TFOP	271
	*	14X, 1H*)					TFOP	272
170	FORMAT (	5X, 1H*, 2X					TFOP	273
	*	5X, 15H					TFOP	274
	*		4OH	GGGGGGGG		, 1X	TFOP	275
275	*	26X					TFOP	276
	P.	13H PPP					TFOP	277
	*	14X, 1H*					TFOP	278
	*	/ . 5X, 1H*, 2X					TFOP	279
	*	26X					TFOP	280
280	*	13H PPP					TFOP	281
	*	14X, 1H*					TFOP	282
	*	/ . 5X, 1H*, 2X					TFOP	283
	*	24X,					TFOP	284
285	*	14X, 1H*					TFOP	285
	*	/ . 5X, 1H*, 2X					TFOP	286
	*	26X					TFOP	

SUBROUTINE	TFOP	74/74	OPT 1		FTN 4.8+577	85/01/23.	OB. 10.44	PAGE 6
<pre> P,13HPPP * 14X,1H* */,5X,1H*,2X *.24X, *.26X         4OH G ,1X P,13HPPP 175 FORMAT ( 5X,1H*,120X,1H*,/.5X,122(1H*) ) C       RETURN       END       295 </pre>								

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES					
1	TFOP	14	294					
VARIABLES	SN	TYPE	RELOCATION					
0 AFFDL		REAL	CAFDL	REFS	16	23	56	
2 ITAPEP		INTEGER	COMRWP	REFS	18			
0 ITAPER		INTEGER	COMRWP	REFS	18			
7 ITAPET		INTEGER	CTABLE	REFS	21			
1 ITAPEW		INTEGER	COMRWP	REFS	18	1/O REFS	53	57
				REFS	58	59	54	56
				REFS	66	67	62	64
				REFS	68		63	65
7 KBPAGE		INTEGER	CLIST	REFS	19			
4 KLABEL		INTEGER	CLIST	REFS	19			
0 KOUNT		INTEGER	CLIST	REFS	19	DEFINED	28	48
11 KOUNTH		INTEGER	CLIST	REFS	19			
12 KOUNTI		INTEGER	CLIST	REFS	19			
1 KPAGE		INTEGER	CLIST	REFS	19			
0 KTABLE		INTEGER	CTABLE	REFS	21			
5 KTABLO		INTEGER	CTABLE	REFS	21			
5 KTPAGE		INTEGER	CLIST	REFS	19			
2 LINES		INTEGER	CLIST	REFS	19			
10 LINESG		INTEGER	CLIST	REFS	19			
3 LINEST		INTEGER	CLIST	REFS	21			
3 NCOLS		INTEGER	CTABLE	REFS	21			
4 NCOLST		INTEGER	CTABLE	REFS	21	DEFINED	30	
6 NPAGE		INTEGER	CLIST	REFS	19			
6 NPAGEA		INTEGER	CTABLE	REFS	21			
1 NPASS		INTEGER	CTABLE	REFS	21			
2 NROWS		INTEGER	CTABLE	REFS	21	DEFINED	31	35
2 VARIABLES USED AS FILE NAMES, SEE ABOVE								
EXTERNALS		TYPE	ARGS	REFERENCES				
PTABLE			3	33	37	40	43	46
TITLES			1	29				
STATEMENT LABELS		DEF LINE		REFERENCES				
201 100 FMT		69		53				
251 105 FMT			87		54			
317 110 FMT			103		55			
...			...		...			

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SUBROUTINE TFOP

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STATEMENT LABELS

	DEF LINE	REFERENCES
377	120	FMT 57
424	125	FMT 58
441	130	FMT 59
454	135	FMT 60
467	140	FMT 61
504	145	FMT 62
525	150	FMT 63
547	155	FMT 64
601	160	FMT 65
641	165	FMT 66
701	170	FMT 67
745	175	FMT 68

COMMON BLOCKS

	LENGTH	MEMBERS - BIAS NAME(LENGTH)	
COMRWP	3	O ITAPER (1)	1 ITAPEW (1)
CLIST	11	O KOUNT (1)	1 KPAGE (1)
		3 LINEST (1)	4 KLABEL (1)
		6 NPAGE (1)	7 KBPAGE (1)
		9 KOUNTH (1)	10 KOUNTI (1)
C TABLE	8	O KTABLE (1)	1 NPASS (1)
		3 NCOLS (1)	4 NCOLST (1)
		6 NPAGEA (1)	7 ITAPET (1)
CAFFDL	4	O AFFDL (4)	

STATISTICS

PROGRAM LENGTH  
CM LABELED COMMON LENGTH  
52000B CM USED

1017B 527  
32B 26

2 ITAPEW (1)  
2 LINES (1)  
5 KTPAGE (1)  
8 LINESG (1)  
1 ITAPEW (1)  
1 KPAGE (1)  
4 KLABEL (1)  
7 KBPAGE (1)  
10 KOUNTI (1)  
1 NPASS (1)  
4 NCOLST (1)  
7 ITAPET (1)

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PAGE 1

```
1      C45730, SUB. LDB (LIST DATA - VERSION B)          2
C      C*** SUBROUTINE LDB (NCOL,KHEAD,NTAPEI,ITAPEI,SKIP) 3
C***   OBJECTIVE *****                                     4
C      C-----                                         ***** 5
C      TO READ AND LIST INPUT DATA FROM THE INPUT STREAM AND TO PREPARE * 6
C      THE FORMATTED INPUT TAPE FOR THE USER'S PROGRAM.    * 7
C      *                                             * 8
C      C*** SUMMARY OF FORTRAN SYMBOLS *****             * 9
C      C-----                                         ***** 10
C      C*** ITAPEI ..... INPUT                         * 11
C      FORMATTED INPUT TAPE IN USER'S ORIGINAL PROGRAM.  * 12
C      *                                             * 13
C      C*** ITAPEO ..... INPUT                         * 14
C      TAPE FOR LISTING CARD DATA.                   * 15
C      *                                             * 16
C      KHEAD ..... INPUT                           * 17
C      CONTROL WORD FOR LISTING TITLE AT TOP OF PAGE AND COLUMN NUMBERS * 18
C      AT TOP AND BOTTOM OF PAGE.                  * 19
C      KHEAD = 1, LIST TITLE AND COLUMN NUMBERS AT TOP OF PAGE ONLY.   * 20
C      KHEAD = 2, LIST TITLE AT TOP OF PAGE AND COLUMN NUMBERS AT TOP * 21
C      AND BOTTOM OF PAGE.                      * 22
C      KHEAD = 3, DO NOT LIST TITLE AT TOP OF PAGE NOR COLUMN NUMBERS * 23
C      AT TOP AND BOTTOM OF PAGE.                 * 24
C      *                                             * 25
C      LINES ..... INPUT                         * 26
C      NUMBER OF LINES TO BE LISTED.           * 27
C      *                                             * 28
C      NCOL ..... INPUT                         * 29
C      NUMBER OF CARD COLUMNS LISTED BY PROGRAM (MUST BE A MULTIPLE OF * 30
C      FOUR).                                * 31
C      *                                             * 32
C      ITAPEI ..... INPUT                         * 33
C      INPUT TAPE FOR READING CARD DATA IN THE INPUT STREAM (MUST BE * 34
C      DIFFERENT FROM INPUT TAPE IN USER'S ORIGINAL PROGRAM - THAT IS * 35
C      NTAPEI SHOULD NOT EQUAL ITAPEI)           * 36
C      *                                             * 37
C      SKIP ..... INPUT                         * 38
C      CONTAINS THE NUMBER OF COLUMNS TO BE SKIPPED BEFORE THE INPUT * 39
C      DATA IS LISTED THIS DATA MUST BE STORED IN THE VARIABLE SKIP * 40
C      USING THE DATA STATEMENT AS FOLLOWS.       * 41
C      *                                             * 42
C      DATA SKIP /'NNX,' /                      * 43
C      WHERE THE NUMBER NN REPRESENTS THE NUMBER OF COLUMNS WHICH ARE * 44
C      TO BE SKIPPED AND SHOULD VARY FROM ONE TO A MAXIMUM OF ONE * 45
C      HUNDRED AND THIRTY TWO MINUS THE NUMBER OF CARD COLUMNS LISTED * 46
C      BY THE PROGRAM (NCOL).                  * 47
C      *                                             * 48
C      ERROR MESSAGES *****                     * 49
C      *-----                                     * 50
C      IF NO CARD DATA IS PROVIDED, AN ERROR MESSAGE IS PRINTED.     * 51
C      *                                             * 52
C      *-----                                     * 53
C      *-----                                     * 54
C      *-----                                     * 55
C      *-----                                     * 56
C      *-----                                     * 57
C      *-----                                     * 58
```

74/74 DPT \* 1

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SUBROUTINE LDB

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PAGE 3

```

115      FMT7(2)= SKIP
          CALL DTABLE (1,CARD)
          C
          C LIST INPUT DATA CARDS AND PREPARE TAPE ITAPE0
          C   PSN(90) TO PSN(1500) ....
          120     90 REWIND ITAPEI
          WRITE (ITAPEI,2000) SKIP
          REWIND ITAPEI
          CALL EOFO1 (NTAPEI,CARD,LCARD,KEOF)
          KARD = KARD + 1
          IF (KEOF .EQ. YES) GO TO 1000
          IF (CARD(2) .EQ. SIXI ) LINESI = 6
          IF (CARD(2) .EQ. EIGHTI) LINESI = 8
          LINESI = LINESI - 2
          LINES = LINESI*INCHES
          KOUNT = LINES
100      CONTINUE
          IF (KOUNT .LT. LINES) GO TO 300
          CALL TITLES (-1)
          CALL PTABLE (2,28,28HPROGRAM LISTING OF CARD DATA)
          IF (LITTLE .GT. 0) CALL DTABLE (2,CARD)
          KOUNT = 0
          IF (KHEAD .EQ. 3) GO TO 200
          IF (LREC .EQ. 18 .OR. LREC .EQ. 20) GO TO 150
          135      WRITE (ITAPEO,FMT1) (T1(L),L=1,8)
          140      CONTINUE
          KOUNT = KOUNT + LSKIP + LTITLE + 2
          IF (LITTLE .EQ. 0) GO TO 160
          IF (LREC .EQ. 18) WRITE (ITAPEO,FMT5) (T1(L), L=1,8)
          IF (LREC .EQ. 20) WRITE (ITAPEO,FMT6) (T1(L), L=1,8)
          CALL PLB (1,1,ITAPEO)
          LTITLE = 0
160      CONTINUE
          WRITE (ITAPEO,FMT2) CARDH, (T2(L), L=1,LREC)
          WRITE (ITAPEO,FMT3) NUMBH, (T3(L), L=1,LREC)
          150      CALL PLB (1,LSKIP,ITAPEO)
          200      CONTINUE
          300      CONTINUE
          CALL DTABLE (3,CARD)
          IF (KFIRST .EQ. YES) GO TO 310
          CALL EOFO1 (NTAPEI,CARD,LCARD,KEOF)
          CALL ENDP (CARD)
          KARD = KARD + 1
          IF (KEOF .EQ. YES) GO TO 900
160      CONTINUE
          KFIRST = NO
          IF (NTAPEI .EQ. ITAPEI) GO TO 350
          WRITE (ITAPEI,2000) CARD
          350      CONTINUE
          WRITE (ITAPEO,FMT7) KARD, CARD
          KOUNT = KOUNT + 1
          IF (KOUNT .LT. (LINES-(LSKIP+2))) GO TO 300
          IF (KHEAD .EQ. 1 .OR. KHEAD .EQ. 3) GO TO 600
          400      CONTINUE
          CALL PLB (1,LSKIP,ITAPEO)
170      CONTINUE

```

```

      WRITE (ITAPEO,FMT4) (T3(L), L=1,LREC)          LDB   173
      KOUNT = KOUNT + LSKIP + 2                      LDB   174
 600 CONTINUE                                         LDB   175
      IF (KEND EQ YES) GO TO 950                     LDB   176
      GO TO 100                                         LDB   177
 900 CONTINUE                                         LDB   178
      IF (KHEAD EQ 1 OR KHEAD EQ 3) GO TO 950         LDB   179
      KEND = YES                                         LDB   180
      LSKIP = LINES - KOUNT - 2                       LDB   181
      GO TO 400                                         LDB   182
 950 CONTINUE                                         LDB   183
      REWIND ITAPEI                                     LDB   184
      GO TO 150C                                         LDB   185
 1000 CONTINUE                                         LDB   186
      WRITE (ITAPEO,3000)                               LDB   187
      CALL EXIT                                         LDB   188
 1500 CONTINUE                                         LDB   189
      C
      C FORMATS
      C FORMAT ( 20A4)
      2000 FORMAT (1H1, //,10X,41H** ERROR MESSAGE FROM SUBROUTINE LDB ***
      3000 FORMAT (1H1, //,10X,72HEXECUTION TERMINATED - CARD INPUT DATA HAS
      1                                              /,10X,72HEXECUTION TERMINATED - CARD INPUT DATA HAS
      2NOT BEEN PROVIDED IN THIS RUN )
      C
      RETURN
      END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
3 LDB	63	197				
VARIABLES	SN	TYPE	RELOCATION			
504 CARD		REAL	REFS	67	116	124
277 CARDH	REAL	REFS	156	157	163	165
302 EIGHTI	REAL	REFS	149	DEFINED	103	
530 FMT1	REAL	ARRAY	REFS	128	DEFINED	106
534 FMT2	REAL	ARRAY	REFS	68	140	DEFINED
542 FMT3	REAL	ARRAY	REFS	68	149	DEFINED
550 FMT4	REAL	ARRAY	REFS	68	150	DEFINED
554 FMT5	REAL	ARRAY	REFS	68	171	172
561 FMT6	REAL	ARRAY	REFS	68	144	DEFINED
566 FMT7	REAL	ARRAY	REFS	68	145	DEFINED
420 INCHES	INTEGER	REFS	130	DEFINED	100	113
0 ITAPEI	INTEGER	F.P.	REFS	162	107	101
O ITAPEO	INTEGER	F.P.	REFS	163	183	114
			I/O REFS	146	151	115
			I/O REFS	140	144	149
417 KARD	INTEGER	REFS	172	186	125	115
7 KRDAC,F	INTEGER	REFS	125	158	165	125
			DFFCS	7		158

SUBROUTINE LOB		74/74 OPT=1		RELOCATION		FTN 4.8+577		85/01/23 08.10.44		PAGE 5	
VARIABLES	SN	TYPE									
411	KEND	INTEGER									
422	KEOF	INTEGER									
415	KFIRST	INTEGER	F								
0	KHEAD	INTEGER	F								
4	KLABEL	INTEGER	CLIST								
0	KOUNT	INTEGER	CLIST								
11	KOUNTH	INTEGER	CLIST								
12	KOUNTI	INTEGER	CLIST								
1	KPAGE	INTEGER	CLIST								
5	KTPAGE	INTEGER	CLIST								
423	L	INTEGER	CLIST								
10	LCARD	INTEGER	CLIST								
2	LINES	INTEGER	CLIST								
416	LINE5	INTEGER	CLIST								
421	LINE5I	INTEGER	CLIST								
3	LINEST	INTEGER	CLIST								
414	LREC	INTEGER	CLIST								
412	LSKIP	INTEGER	CLIST								
413	LTITLE	INTEGER	F.P.								
0	NCOL	INTEGER	CONSTS								
0	NO	INTEGER	CLIST								
6	NPAGE	INTEGER	F.P.								
0	NTAPE1	INTEGER	REFS								
300	NUMBH	INTEGER	REFS								
301	SIXI	REAL	REFS								
0	SKIP	REAL	REFS								
424	T1	REAL	ARRAY								
434	T2	REAL	ARRAY								
460	T3	REAL	ARRAY								
1	YES	INTEGER	CONSTS								
VARIABLES USED AS FILE NAMES, SEE ABOVE											
EXTERNALS		TYPE	ARGS		REFERENCES						
DTABLE			2		116	136	154				
ENDP			1		157						
EFOF1			4		124	156					
EXIT			0		187						
PLB			3		146	151	170				
PTABLE			3		135						
TITLES			1		134						
STATEMENT LABELS					DEF LINE REFERENCES						
0	20	INACTIVE			79						
0	80	INACTIVE			112						
0	90	INACTIVE			121						
64	100				132	176					
107	150				141	139					
126	160				148	143					
143	200				152	138					
143	300				153	133	167				

SUBROUTINE LDB

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STATEMENT LABELS

	DEF LINE	REFERENCES
160	310	160 155
165	350	164 162
177	400	169 181
217	600	174 168
222	900	177 159
233	950	182 175
236	1000	185 126
241	1500	188 184
364	2000 FMT	192 122
366	3000 FMT	193 186

COMMON BLOCKS LENGTH

	MEMBERS - BIAS NAME(LENGTH)
CLIST	O KOUNT (1)
	3 LINEST (1)
	6 NPAGE (1)
	9 KOUNTH (1)
CONSTS	O NO (1)

STATISTICS

PROGRAM LENGTH  
CM LABELED COMMON LENGTH  
52000B CM USED

5778 383  
15B 13

1 KPAGE (1)  
4 KLABEL (1)  
5 KTPAGE (1)  
7 KBPAGE (1)  
10 KOUNTI (1)  
1 YES (1)

```

1      C45700, SUB. SETUP (ASSIGN TAPE AND DISK UNITS FOR VARIOUS DATA BLOCKS)      2
C      ****SETUP****      3
C      ****      4
C      ****SUBROUTINE SETUP****      5
C      ****      6
C      ****COMPUTER VERSION****      7
C      ****      8
C      ****      9
C      ****      10
C      ****      11
C      ****      12
C      ****      13
C      ****      14
C      ****      15
C      ****      16
C      ****      17
C      ****      18
C      ****      19
C      ****      20
C      ****      21
C      ****      22
C      ****      23
C      ****      24
C      ****      25
C      ****      26
C      ****      27
C      ****      28
C      ****      29
C      ****      30
C      ****      31
C      ****      32
C      ****      33
C      ****      34
C      ****      35
C      ****      36
C      ****      37
C      ****      38
C      ****      39
C      ****      40
C      ****      41
C      ****      42
C      ****      43
C      ****      44
C      ****      45
C      ****      46
C      ****      47
C      ****      48
C      ****      49
C      ****      50
C      ****      51
C      ****      52
C      ****      53
C      ****      54
C      ****      55
C      ****      56
C      ****      57
C      ****      58

1      C      COLLECTS TOGETHER ALL THE TAPE AND DISK UNIT ASSIGNMENTS.      15
C      INPUT/OUTPUT      16
C      NO INPUT TO THIS PROGRAM. OUTPUT CONSISTS OF UNIT NUMBERS THAT      17
C      WILL STORE THE DIFFERENT SETS OF DATA NEEDED IN THE PROGRAM.      18
C      SUMMARY OF SYMBOLS      19
C      ERROR MESSAGES      20
C      NONE.      21
C      SUBROUTINE SETUP(KINIT)      22
C      DIMENSION ISETUP(45),IPOS(20),IFILES(50),ITAPES(50),JSETUP(25)      23
C      COMMON /DSRN / JSETUP      24
C      COMMON /FILE / IPOS      25
C      COMMON /MATRIX/ ISETUP      26
C      COMMON /SUM / LST ,LSF ,LDT ,LDF ,LMT ,LMF      27
C      COMMON /CSETUP/ IOINC      28
C      COMMON /CFILES/ KFILES,IFILES      29
C      COMMON /CTAPES/ ITAPES      30
C      IF (KINIT .EQ. 1) GO TO 100      31
C      MTAPES = ITAPES(1)      32
C      MPOS  = IPOS(1)      33
C      100 CONTINUE      34
C      DO 130 I=1,MTAPES      35
C      IFILES(I) = 1      36
C      130 ITAPES(I) = I      37
C      ITAPES( 2) = 17      38
C      ITAPES( 8) = 18      39
C      ITAPES(13) = 13 - IOINC      40

```

SUBROUTINE DTABLE		74/74	OPT=1		FTN 4 . 8+577	85/01/23 . 08 . 10 . 44	PAGE	11
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES			
115	600	MOD	105 110	15B				
120	600	NPA	107 110	7B	INSTACK			
COMMON	BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		EXITS	NOT INNER		
CONSTS	2		O NO (1)					
CTABLE	8		O KTABLE (1)					
			O NCOLS (1)					
			3 NCOLS (1)					
			6 NPAGEA (1)					
					1 YES (1)			
					1 NPASS (1)			
					4 NCOLST (1)			
					5 KTABLO (1)			
					7 ITAPET (1)			
 STATISTICS								
PROGRAM LENGTH		1317B	719					
CM LABELED COMMON LENGTH		12B	10					
52000B CM USED								

SUBROUTINE DTABLE	74/74 OPT=1	DEF LINE	REFERENCES
STATEMENT LABELS			
342 3080	247	215	
343 3090	249	215	
344 4000	255	117	
363 4001	259	257	
370 4010	265	257	
371 4020	267	257	
372 4030	269	257	
373 4040	271	257	
374 4050	273	257	
375 4060	275	257	
376 4070	277	257	
377 4080	279	257	
400 4090	281	257	
401 5000	287	117	
420 5001	291	289	
425 5010	297	289	
426 5020	299	289	
427 5030	301	289	
430 5040	303	289	
430 5050	304	289	
431 5060	306	289	
432 5070	308	289	
433 5080	310	289	
434 5090	312	289	
435 6000	318	117	
454 6001	322	320	
461 6010	328	320	
462 6020	330	320	
463 6030	332	320	
464 6040	334	320	
465 6050	336	320	
466 6060	338	320	
467 6070	340	320	
470 6080	342	320	
471 6090	344	320	
472 7000	350	117	
511 7001	354	352	
516 7010	360	352	
517 7020	362	352	
520 7030	364	352	
521 7040	366	352	
522 7050	368	352	
523 7060	370	352	
524 7070	372	352	
525 7080	374	352	
526 7090	376	352	
526 10000	378	111	
		132	142
		156	184
		172	188
		200	226
		204	230
		244	248
		246	250
		274	278
		276	280
		305	309
		307	313
		335	339
		337	341
		365	367
		369	371
		89	101

154  
196  
192  
234  
238  
242  
270  
272  
300  
302  
333  
331  
361  
363

148  
150  
188  
222  
230  
266  
268  
296  
298  
327  
329  
345  
359

282  
280  
311  
313  
343  
345  
375



SUBROUTINE DTABLE				74/74 OPT=1			
ENTRY	POINTS	DEF	LINE	REFERENCES			
3	DTABLE	4	4	382			
VARIABLES	SN	TYPE		RELOCATION			
713	BLANK	REAL		CTABL			
O	CARD	REAL		F.P.			
1013	CARD1	REAL		CTABL			
			ARRAY	CTABL			
743	F4OO	REAL		CTABL			
712	FOP	REAL		CTABL			
744	FDOO	REAL		CTABL			
7	ITAPET	INTEGER		CTABL			
O	KINIT	INTEGER		CTABL			
O	KTABLE	INTEGER		CTABL			
5	KTABLE	INTEGER		CTABL			
777	LAST	INTEGER		CTABL			
714	LA00	REAL		CTABL			
715	LA01	REAL		CTABL			
716	LA02	REAL		CTABL			
717	LA04	REAL		CTABL			
720	LA07	REAL		CTABL			
776	MAX	INTEGER		CTABL			
774	MAXMOD	INTEGER		CTABL			
775	MAXPAR	INTEGER		CTABL			
1007	MOD	INTEGER		CTABL			
1005	MODFA	INTEGER		CTABL			
1006	MODFO	INTEGER		CTABL			
1000	MODLA	INTEGER		CTABL			
1001	MODSA	INTEGER		CTABL			
1003	MODSO	INTEGER		CTABL			
1002	MODTA	INTEGER		CTABL			
1010	MODULE	INTEGER		CTABL			
1004	MODVA	INTEGER		CTABL			
3	NCOLS	INTEGER		CTABL			
4	NCOLST	INTEGER		CTABL			
O	NO	INTEGER		CTABL			
1011	NPA	INTEGER		CTABL			
6	NPAGEA	INTEGER		CTABL			
1012	NPART	INTEGER		CTABL			
1	NPASS	INTEGER		CTABL			
2	NROWS	INTEGER		CTABL			
721	SA00	REAL		CTABL			
722	SA01	REAL		CTABL			
723	SA02	REAL		CTABL			
724	SA03	REAL		CTABL			
725	SA04	REAL		CTABL			
726	SA05	REAL		CTABL			
727	SA06	REAL		CTABL			

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53	DEFINED	23	DEFINED	4	59
96	98	109	DEFINED	57	58
9	53	109	DEFINED	66	67
61	63	64	65	75	77
70	71	72	74	87	
79	81	83	85		
85	DEFINED	47			
98	DEFINED	15			
87	DEFINED	48			
12	DEFINED	12			
17	DEFINED	4			
12	DEFINED	95	113	379	
12	72	79	81	83	85
61	54	61	DEFINED	24	87
7	7	57	DEFINED	25	
7	7	58	DEFINED	26	
7	7	59	DEFINED	27	
7	60	60	DEFINED	28	
53	DEFINED	52			
52	105	DEFINED	50		
52	54	107	DEFINED	51	
106	DEFINED	105			
85	DEFINED	84			
87	DEFINED	86			
57	58	59	60	61	
56	63	64	65	66	69
63	71	72	DEFINED	67	
81	DEFINED	80			
74	75	76	77	78	79
73	73	73			
109	117	DEFINED	106		
83	DEFINED	82			
12	DEFINED	94	115	129	169
293	324	356			219
12	11	379			
108	DEFINED	107			
12	109	125	165	215	257
DEFINED	108				289
12	12	DEFINED	93	114	128
292	323	355			
72	DEFINED	29			
63	DEFINED	30			
64	DEFINED	31			
65	DEFINED	32			
66	DEFINED	33			
67	DEFINED	34			
68	DEFINED	35			

SUBROUTINE DTABLE 74/74 OPT=1

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```
GO TO 10000          DTABLE 344
6090 CONTINUE        DTABLE 345
GO TO 10000          DTABLE 346
C                   DTABLE 347
C                   DTABLE 348
C AUTOMATED FLUTTER OPTIMIZATION MODULE
C                   DTABLE 349
7000 CONTINUE        DTABLE 350
C                   DTABLE 351
C                   DTABLE 352
GO TO (7010,7020,7030,7040,7050,7060,7070,7080,7090,7001). NPART
C                   DTABLE 353
7001 CONTINUE        DTABLE 354
NROWS = 1            DTABLE 355
NCOLS = 3            DTABLE 356
CALL PTABLE (2,37,37
1 HAUTOMATED FLUTTER OPTIMIZATION MODULE)
GO TO 10000          DTABLE 357
7010 CONTINUE        DTABLE 358
GO TO 10000          DTABLE 359
7020 CONTINUE        DTABLE 360
GO TO 10000          DTABLE 361
7030 CONTINUE        DTABLE 362
GO TO 10000          DTABLE 363
7040 CONTINUE        DTABLE 364
GO TO 10000          DTABLE 365
7050 CONTINUE        DTABLE 366
GO TO 10000          DTABLE 367
7060 CONTINUE        DTABLE 368
GO TO 10000          DTABLE 369
7070 CONTINUE        DTABLE 370
GO TO 10000          DTABLE 371
7080 CONTINUE        DTABLE 372
GO TO 10000          DTABLE 373
7090 CONTINUE        DTABLE 374
C                   DTABLE 375
10000 CONTINUE       DTABLE 376
KTABLE = NO          DTABLE 377
20000 CONTINUE       DTABLE 378
C                   DTABLE 379
RETURN              DTABLE 380
END                 DTABLE 381
DTABLE 382
DTABLE 383
DTABLE 384
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

17 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

SUBROUTINE DTABLE 74/74 OPT+1

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C 5000 CONTINUE DTABLE 287  
C GO TO (5010,5020,5030,5040,5050,5060,5070,5080,5090,5001). NPART DTABLE 288  
C 5001 CONTINUE DTABLE 289  
C NROWS = 1 DTABLE 290  
C NCOLS = 3 DTABLE 291  
C CALL PTABLE (2,35,35 DTABLE 292  
1 HAUTOMATED VIBRATION ANALYSIS MODULE)  
GO TO 10000 DTABLE 293  
5010 CONTINUE DTABLE 294  
GO TO 10000 DTABLE 295  
5020 CONTINUE DTABLE 296  
GO TO 10000 DTABLE 297  
5030 CONTINUE DTABLE 298  
GO TO 10000 DTABLE 299  
5040 CONTINUE DTABLE 300  
5050 CONTINUE DTABLE 301  
GO TO 10000 DTABLE 302  
5060 CONTINUE DTABLE 303  
GO TO 10000 DTABLE 304  
5070 CONTINUE DTABLE 305  
GO TO 10000 DTABLE 306  
5080 CONTINUE DTABLE 307  
GO TO 10000 DTABLE 308  
5090 CONTINUE DTABLE 309  
GO TO 10000 DTABLE 310  
C DTABLE 311  
C AUTOMATED FLUTTER ANALYSIS MODULE DTABLE 312  
C 6000 CONTINUE DTABLE 313  
C GO TO (6010,6020,6030,6040,6050,6060,6070,6080,6090,6001). NPART DTABLE 314  
C 6001 CONTINUE DTABLE 315  
C NROWS = 1 DTABLE 316  
C NCOLS = 3 DTABLE 317  
C CALL PTABLE (2,33,33 DTABLE 318  
1 HAUTOMATED FLUTTER ANALYSIS MODULE)  
GO TO 10000 DTABLE 319  
6010 CONTINUE DTABLE 320  
GO TO 10000 DTABLE 321  
6020 CONTINUE DTABLE 322  
GO TO 10000 DTABLE 323  
6030 CONTINUE DTABLE 324  
GO TO 10000 DTABLE 325  
6040 CONTINUE DTABLE 326  
GO TO 10000 DTABLE 327  
6050 CONTINUE DTABLE 328  
GO TO 10000 DTABLE 329  
6060 CONTINUE DTABLE 330  
GO TO 10000 DTABLE 331  
6070 CONTINUE DTABLE 332  
GO TO 10000 DTABLE 333  
6080 CONTINUE DTABLE 334  
GO TO 10000 DTABLE 335  
6090 CONTINUE DTABLE 336  
GO TO 10000 DTABLE 337  
6100 CONTINUE DTABLE 338  
GO TO 10000 DTABLE 339  
6110 CONTINUE DTABLE 340  
GO TO 10000 DTABLE 341  
6120 CONTINUE DTABLE 342

SUBROUTINE DTABLE 74/74 OPT=1

FTN 4.8+577

PAGE 5

1 HCORRESPONDENCE TABLE FOR AERODYNAMICS GRID)  
GO TO 10000 DTABLE 230  
3030 CONTINUE DTABLE 231  
CALL PTABLE (2, 37, 37 DTABLE 232  
1 HCORRESPONDENCE TABLE FOR WEIGHT GRID)  
GO TO 10000 DTABLE 233  
DTABLE 234  
3040 CONTINUE DTABLE 235  
CALL PTABLE (2, 38, 38 DTABLE 236  
1 HCORRESPONDENCE TABLE FOR DYNAMICS GRID)  
GO TO 10000 DTABLE 237  
DTABLE 238  
DTABLE 239  
3050 CONTINUE DTABLE 240  
CALL PTABLE (2, 37, 37 DTABLE 241  
1 HDYNAMICS GRID TO GENERATE FLEXIBILITY)  
GO TO 10000 DTABLE 242  
3060 CONTINUE DTABLE 243  
GO TO 10000 DTABLE 244  
DTABLE 245  
3070 CONTINUE DTABLE 246  
GO TO 10000 DTABLE 247  
3080 CONTINUE DTABLE 248  
GO TO 10000 DTABLE 249  
DTABLE 250  
3090 CONTINUE DTABLE 251  
GO TO 10000 DTABLE 252  
C DTABLE 253  
C AUTOMATED STRUCTURAL OPTIMIZATION MODULE  
C DTABLE 254  
4000 CONTINUE C DTABLE 255  
C GO TO (4010, 4020, 4030, 4040, 4050, 4060, 4070, 4080, 4090, 4001), NPART  
C DTABLE 256  
C DTABLE 257  
C DTABLE 258  
C DTABLE 259  
4001 CONTINUE DTABLE 260  
NROWS = 1 DTABLE 261  
NCOLS = 3 DTABLE 262  
CALL PTABLE (2, 40, 40 DTABLE 263  
1 HAUTOMATED STRUCTURAL OPTIMIZATION MODULE)  
GO TO 10000 DTABLE 264  
4010 CONTINUE DTABLE 265  
GO TO 10000 DTABLE 266  
4020 CONTINUE DTABLE 267  
GO TO 10000 DTABLE 268  
4030 CONTINUE DTABLE 269  
GO TO 10000 DTABLE 270  
4040 CONTINUE DTABLE 271  
GO TO 10000 DTABLE 272  
4050 CONTINUE DTABLE 273  
GO TO 10000 DTABLE 274  
4060 CONTINUE DTABLE 275  
GO TO 10000 DTABLE 276  
4070 CONTINUE DTABLE 277  
GO TO 10000 DTABLE 278  
4080 CONTINUE DTABLE 279  
GO TO 10000 DTABLE 280  
4090 CONTINUE DTABLE 281  
GO TO 10000 DTABLE 282  
C DTABLE 283  
C AUTOMATED VIBRATION ANALYSIS MODULE F  
284  
C DTABLE 285  
DTARI F  
286



SUBROUTINE DTABLE 74/74 OPT=1 FTN 4.8+577 85/01/23 08.10.44 PAGE 3

```

115      NCOLS = 6          DTABLE 116
         C   GO TO (1000, 2000, 3000, 4000, 5000, 6000, 7000), MODULE DTABLE 117
         C
         C AUTOMATED LOAD ANALYSIS MODULE DTABLE 118
         C
120      1000 CONTINUE DTABLE 119
         C
         C GO TO (1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1001), NPART DTABLE 120
         C
125      1001 CONTINUE DTABLE 121
         C   NROWS = 1          DTABLE 122
         C   NCOLS = 3          DTABLE 123
         C   CALL PTABLE (2,30,30) DTABLE 124
         C   1  HAUTOMATED LOAD ANALYSIS MODULE) DTABLE 125
         C   GO TO 10000
1010     CONTINUE DTABLE 126
         C   CALL PTABLE (2,52,52)
         C   1  HAERODYNAMIC INFLUENCE COEFFICIENTS FOR SUBSONIC FLOW) DTABLE 127
         C   GO TO 10000
1020     CONTINUE DTABLE 128
         C   CALL PTABLE (2,54,54)
         C   1  HAERODYNAMIC INFLUENCE COEFFICIENTS FOR SUPERSONIC FLOW) DTABLE 129
         C   GO TO 10000
1030     CONTINUE DTABLE 130
         C   GO TO 10000
1040     CONTINUE DTABLE 131
         C   CALL PTABLE (2,17,17)
         C   1  HAERODYNAMIC LOADS) DTABLE 132
         C   GO TO 10000
1050     CONTINUE DTABLE 133
         C   GO TO 10000
1060     CONTINUE DTABLE 134
         C   GO TO 10000
1070     CONTINUE DTABLE 135
         C   CALL PTABLE (2,14,14)
         C   1  HINERTIAL LOADS) DTABLE 136
         C   GO TO 10000
1080     CONTINUE DTABLE 137
         C   GO TO 10000
1090     CONTINUE DTABLE 138
         C   GO TO 10000
1100     CONTINUE DTABLE 139
         C
         C AUTOMATED STRUCTURAL ANALYSIS MODULE DTABLE 140
         C
1155     2000 CONTINUE DTABLE 141
         C
         C GO TO (2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2001), NPART DTABLE 142
         C
1170     2001 CONTINUE DTABLE 143
         C   NROWS = 1          DTABLE 144
         C   NCOLS = 3          DTABLE 145
         C   CALL PTABLE (2,36,36)
         C   1  HAUTOMATED STRUCTURAL ANALYSIS MODULE) DTABLE 146
         C
  
```

SUBROUTINE DTABLE 74/74 OPT=1  
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```

CARD1( 2,MODLA) = LA02          DTABLE 59
CARD1( 4,MODLA) = LA04          DTABLE 60
CARD1( 7,MODLA) = LA07          DTABLE 61
CARD1(LAST,MODLA) = LA00         DTABLE 62
MODSA = 2                         DTABLE 63
CARD1( 1,MODSA) = SA01          DTABLE 64
CARD1( 2,MODSA) = SA02          DTABLE 65
CARD1( 3,MODSA) = SA03          DTABLE 66
CARD1( 4,MODSA) = SA04          DTABLE 67
CARD1( 5,MODSA) = SA05          DTABLE 68
CARD1( 6,MODSA) = SA06          DTABLE 69
CARD1( 7,MODSA) = SA07          DTABLE 70
CARD1( 8,MODSA) = SA08          DTABLE 71
CARD1( 9,MODSA) = SA09          DTABLE 72
CARD1(LAST,MODSA) = SA00         DTABLE 73
MODTA = 3                         DTABLE 74
CARD1( 1,MODTA) = TAO1          DTABLE 75
CARD1( 2,MODTA) = TAC1          DTABLE 76
CARD1( 3,MODTA) = TAC2          DTABLE 77
CARD1( 4,MODTA) = TAC3          DTABLE 78
CARD1( 5,MODTA) = TADG          DTABLE 79
CARD1(LAST,MODTA) = TAO0          DTABLE 80
MODSO = 4                         DTABLE 81
CARD1(LAST,MODSO) = S000          DTABLE 82
MODVA = 5                         DTABLE 83
CARD1(LAST,MODVA) = VAO0          DTABLE 84
MODFA = 6                         DTABLE 85
CARD1(LAST,MODFA) = FA00          DTABLE 86
MODFO = 7                         DTABLE 87
CARD1(LAST,MODFO) = F000          DTABLE 88
C      GO TO 20000                  DTABLE 89
90   400 CONTINUE                   DTABLE 90
C      GO TO 20000                  DTABLE 91
C      GO TO 20000                  DTABLE 92
C      GO TO 20000                  DTABLE 93
C      NROWS = 1                     DTABLE 94
C      NCOLS = 3                     DTABLE 95
95   KTABLE = 2                     DTABLE 96
     IF (CARD .EQ. SOP) CALL PTABLE (2,31,31
     1 HSTRUCTURAL OPTIMIZATION PACKAGE)
     1 IF (CARD .EQ. FOP) CALL PTABLE (2,28,28
     1 HFLUTTER OPTIMIZATION PACKAGE)
100   C      GO TO 20000                  DTABLE 100
     500 CONTINUE
C      DO 600 MOD=1 MAXMOD
     600 MODULE = MOD
     600 NPA=1 MAXPAR
     NPART = NPA
     IF (CARD1(NPART,MODULE) .EQ. CARD) GO TO 610
110   600 CONTINUE
     610 CONTINUE
     610 KTABLE = YES
     NPART = 1
  
```

```

SUBROUTINE DTABLE   74/74    OPT=1          FTN 4.8+577      85/01/23. 08.10.44    PAGE 1

1      C   C45700. SUB DTABLE (DATA TABLE OF CONTENTS)          DTABLE 2
C   SUBROUTINE DTABLE (KINIT,CARD)          DTABLE 3
C
5      C   INTEGER YES          DTABLE 4
C   REAL LA00, LA01, LA02, LA04, LA07          DTABLE 5
C
10     C   DIMENSION CARD1(10,7)          DTABLE 6
C
15     C   COMMON /CONSTS/ NOYES          DTABLE 7
C   COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS .NCOLST,KTABLO,NPAGEA
1      C   DATA S0P /4HSOP /
C   DATA F0P /4HF0P /
C
20     C   GO TO (100, 400, 500), KINIT          DTABLE 8
C   100 CONTINUE          DTABLE 9
C
25     C   DATA BLANK /4H /          DTABLE 10
C   DATA LA00 /4HLA00/
C   DATA LA01 /4HLA01/
C   DATA LA02 /4HLA02/
C   DATA LA04 /4HLA04/
C   DATA LA07 /4HLA07/
C   DATA SA00 /4HSA00/
C   DATA SA01 /4HSA01/
C   DATA SA02 /4HSA02/
C   DATA SA03 /4HSA03/
C   DATA SA04 /4HSA04/
C   DATA SA05 /4HSA05/
C   DATA SA06 /4HSA06/
C   DATA SA07 /4HSA07/
C   DATA SA08 /4HSA08/
C   DATA SA09 /4HSA09/
C   DATA TA00 /4HTA00/
C   DATA TA01 /4HTA01/
C   DATA TA01 /4HTAC1/
C   DATA TA02 /4HTAC2/
C   DATA TA03 /4HTAC3/
C   DATA TA06 /4HTADG/
C   DATA SD00 /4HS00/
C   DATA VA00 /4HVA00/
C   DATA FA00 /4HFA00/
C   DATA FO00 /4HF00/
C
30     C   MAXMOD = 7          DTABLE 11
C   MAXPAR = 10          DTABLE 12
C   MAX = MAXMOD*MAXPAR          DTABLE 13
C   CALL DVALUE (CARD1,BLANK,MAX)
C   LAST = MAXPAR          DTABLE 14
C
35     C   MODLA = 1 MODLA = 1A01          DTABLE 15
C
40     C
C
45     C
C
50     C
C
55     C

```

SUBROUTINE	ENDP	74/74	OPT=1		FTN 4.8+577	85/01/23 . 08.10.44	PAGE	2
STATEMENT LABELS 26 200		DEF LINE 27	REFERENCES 19	21				
COMMON BLOCKS CPLOTF	LENGTH 1	MEMBERS - BIAS NAME(LENGTH) 0 KPLOTF (1)					23	
STATISTICS PROGRAM LENGTH CM LABELED COMMON LENGTH 52000B CM USED		33B 1B	27 1					

```

1      SUBROUTINE ENDP    74/74   OPT=1           FTN 4.8+577   85/01/23. 08. 10.44   PAGE
2      C45700, SUB. ENDP (DEFINE KPLOTF FOR ENDING PLOTS IN AFAM)
3      C THIS ROUTINE SEARCHES THE CARD INPUT DATA TO LOCATE THE VALUE OF
4      C LC(14). THEN
5      C IF LC(14) = 0, KPLOTF = 1
6      C IF LC(14) = 1, KPLOTF = 2
7      C
8      C SUBROUTINE ENDP (CARD)
9      C
10     C DIMENSION CARD(1)
11
12     C COMMON /CPLOTF/ KPLOTF
13
14     C DATA FAOO /4HFAOO/
15     C DATA KSTART /2/
16     C DATA ONE  /4H 1/
17     C DATA KOUNTL /-1/
18
19     C
20     C IF (KSTART .EQ. 1) GO TO 200
21     C IF (CARD(1) .EQ. FAOO) KOUNTL = 0
22     C IF (KOUNTL .EQ. -1) GO TO 200
23     C KOUNTL = KOUNTL + 1
24     C IF (KOUNTL .LT. 5) GO TO 200
25     C IF (CARD(5) .NE. ONE ) KPLOTF = 1
26     C IF (CARD(5) .EQ. ONE ) KPLOTF = 2
27
28     C 200 CONTINUE
29
30     C RETURN
31

```

**CABD NBR SEV DITY DETAILS DIAGNOSIS OF PROBLEMS**

24 I CARD ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.  
25 I CARD ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

```

ITAPES(31) = 11 - IOINC      59
KFILES = 1                   60
C
MATXC1 = 0                   61
MATXC2 = 0                   62
MATXM1 = 0                   63
MATXM2 = 0                   64
MATXS1 = 0                   65
MATXS2 = 0                   66
MEMOUT = 0                   67
NTAPLT = 0                   68
SETUP
DG 30 J=1,MPOS              69
SETUP
IPOS(J) = 1                  70
SETUP
30 CONTINUE
JDSRN = 1                   71
SETUP
ISCR = 2                   72
SETUP
JSZR = 3                   73
SETUP
75
MDSRN = 4                   74
NDSRN = 8                   75
    - IOINC
LDSRN = 9                   76
    - IOINC
IDSRN = 10                  77
    - IOINC
KSCR = 11                  78
    - IOINC
LSCR = 12                  79
    - IOINC
MSCR = 13                  80
    - IOINC
NSCR = 14                  81
    - IOINC
NTAPC = JDSRN               82
SETUP
IFILC = 1                   83
SETUP
NTAPBC = JDSRN               84
SETUP
IFILBC = 2                   85
SETUP
NTAPL = JDSRN               86
SETUP
IFILL = 3                   87
SETUP
NTAPM = JDSRN               88
SETUP
IFILM = 4                   89
SETUP
NTAPK = MDSRN               90
SETUP
IFILK = 1                   91
NTAPDD = MDSRN               92
SETUP
IFILDD = 1                   93
SETUP
NTAPIS = JDSRN               94
SETUP
IFILIS = 3                   95
SETUP
NTAPST = NDSRN               96
SETUP
IFILST = 1                   97
SETUP
NTAPES = LDSRN               98
SETUP
NTAPD = LDSRN               99
SETUP
IFILD = 2                   100
SETUP
IFILLT = 1                   101
SETUP
NTAPDC = LDSRN               102
SETUP
IFILDC = 0                   103
SETUP
NTAPS = LDSRN               104
SETUP
NTAPT = NDSRN               105
SETUP
IFILT = 2                   106
SETUP
LMT = JDSRN+NDSRN           107
SETUP
LMF = IFILM+2                108
SETUP
NTSDL=KSCR                  109
SETUP
IFTSDL = 1                   110
SETUP
NTAKDI=LSCR                 111
IFIKDI = 1                   112
SETUP
CONTINUE

```

```

115      IFTRAN = 0
        IF (JATRAN .GT. 0) IFTRAN = IFTRAN + 1
        IF (JWTRAN .GT. 0) IFTRAN = IFTRAN + 1
        IF (JDTRAN .GT. 0) IFTRAN = IFTRAN + 1
        NTAERO=14
        IFAERO=15
120      C
        C TRANSFER BASIC INFORMATION TO THE GENERAL VARIABLES
        C
125      ISETUP( 1) = MATXC1
        ISETUP( 2) = MATXC2
        ISETUP( 3) = NTAPC
        ISETUP( 4) = IFILC
        ISETUP( 5) = NTAPBC
        ISETUP( 6) = IFILBC
        ISETUP( 7) = NTAPL
        ISETUP( 8) = IFILL
        ISETUP( 9) = MATXM1
        ISETUP(10) = MATXM2
        ISETUP(11) = NTAPM
        ISETUP(12) = IFILM
        ISETUP(13) = NTAPK
        ISETUP(14) = IFILK
        ISETUP(15) = NTAPD
        ISETUP(16) = IFILDD
        ISETUP(17) = NTAPST
        ISETUP(18) = IFILST
        ISETUP(19) = NTAPES
        ISETUP(20) = IFILFS
        ISETUP(21) = NTAPD
        ISETUP(22) = IFILD
        ISETUP(23) = NTAPDC
        ISETUP(24) = IFILDC
        ISETUP(25) = MATXS1
        ISETUP(26) = MATXS2
        ISETUP(27) = NTAPS
        ISETUP(28) = IFILS
        ISETUP(29) = MEMOUT
        ISETUP(30) = NTAPT
        ISETUP(31) = IFILT
        ISETUP(32) = NTAPLT
        ISETUP(33) = IFILLT
        ISETUP(34) = IS12
        ISETUP(35) = KOR
        ISETUP(36) = NTAPIS
        ISETUP(37) = IFILLIS
        ISETUP(38) = NTTSDL
        ISETUP(39) = IFTSDL
        ISETUP(40) = NTAIDI
        ISETUP(41) = IFIKDI
        ISETUP(42) = NTTTRAN
        ISETUP(43) = IFTRAN
        ISETUP(44) = NTAERO
        ISETUP(45) = IFAERO
        ISETUP( 1) = JDSEN
        ISETUP( ?) = KNODP

```

```

116      SETUP 116
        SETUP 117
        SETUP 118
        SETUP 119
        SETUP 120
        SETUP 121
        SETUP 122
        SETUP 123
        SETUP 124
        SETUP 125
        SETUP 126
        SETUP 127
        SETUP 128
        SETUP 129
        SETUP 130
        SETUP 131
        SETUP 132
        SETUP 133
        SETUP 134
        SETUP 135
        SETUP 136
        SETUP 137
        SETUP 138
        SETUP 139
        SETUP 140
        SETUP 141
        SETUP 142
        SETUP 143
        SETUP 144
        SETUP 145
        SETUP 146
        SETUP 147
        SETUP 148
        SETUP 149
        SETUP 150
        SETUP 151
        SETUP 152
        SETUP 153
        SETUP 154
        SETUP 155
        SETUP 156
        SETUP 157
        SETUP 158
        SETUP 159
        SETUP 160
        SETUP 161
        SETUP 162
        SETUP 163
        SETUP 164
        SETUP 165
        SETUP 166
        SETUP 167
        SETUP 168
        SETUP 169
        SETUP 170
        SETUP 171
        SETUP 172

```

```

JSETUP( 3) = LDSRN
JSETUP( 4) = MDSRN
JSETUP( 5) = NDSRN
175   JSETUP( 6) = IDSRN
      JSETUP( 7) = ISCR
      JSETUP( 8) = JSCR
      JSETUP( 9) = KSCR
      JSETUP(10) = LSCR
      JSETUP(11) = MSCR
      JSETUP(12) = NSCR
      JSETUP(13) = ISC
      RETURN
      END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY 3	POINTS SETUP	DEF LINE 31	REFERENCES 183	RELOCATION	REFS	2*54 100	DEFINED 175	DEFINED 52	78
244	I	INTEGER			REFS	95	DEFINED	52	
264	IDSRN	INTEGER			REFS	169	DEFINED	120	
334	IFAERO	INTEGER			REFS	165	DEFINED	113	
325	IFIKDI	INTEGER			REFS	130	DEFINED	86	
274	IFILBC	INTEGER			REFS	128	DEFINED	84	
272	IFILC	INTEGER			REFS	146	DEFINED	101	
313	IFILD	INTEGER			REFS	148	DEFINED	104	
316	IFILDC	INTEGER			REFS	140	DEFINED	94	
304	IFILDO	INTEGER			REFS	34	DEFINED	41	
1	IFILES	INTEGER		ARRAY CFILES	REFS	144	DEFINED	53	
335	IFILFS	* INTEGER	*UNDEF		REFS	161	DEFINED	96	
306	FILIS	INTEGER			REFS	138	DEFINED	92	
302	IFILK	INTEGER			REFS	132	DEFINED	88	
276	IFILL	INTEGER			REFS	157	DEFINED	102	
314	IFILLT	INTEGER			REFS	109	DEFINED	90	
300	IFILM	INTEGER			REFS	152	DEFINED	98	
336	IFILS	* INTEGER	*UNDEF		REFS	142	DEFINED	107	
310	IFILST	INTEGER			REFS	115	DEFINED	117	
321	IFILT	INTEGER			REFS	116	DEFINED	118	
327	IFTRAN	INTEGER			REFS	117	DEFINED	116	
323	IFTSDL	INTEGER		CSETUP	REFS	40	DEFINED	111	
0	IOINC	INTEGER			REFS	80	DEFINED	58	
0	IPOS	INTEGER		FILE	REFS	34	DEFINED	82	
342	ISC	* INTEGER	*UNDEF		REFS	182	DEFINED	37	
257	ISCR	INTEGER		ARRAY MATRIX	REFS	176	DEFINED	50	
0	ISETUP	INTEGER			REFS	34	DEFINED	73	

JSETUP( 3) = LDSRN	SETUP	173
JSETUP( 4) = MDSRN	SETUP	174
JSETUP( 5) = NDSRN	SETUP	175
JSETUP( 6) = IDSRN	SETUP	176
JSETUP( 7) = ISCR	SETUP	177
JSETUP( 8) = JSCR	SETUP	178
JSETUP( 9) = KSCR	SETUP	179
JSETUP(10) = LSCR	SETUP	180
JSETUP(11) = MSCR	SETUP	181
JSETUP(12) = NSCR	SETUP	182
JSETUP(13) = ISC	SETUP	183
RETURN	SETUP	184
END	SETUP	185

SUBROUTINE SETUP				74/74	OPT=1	RELOCATION		FTN 4.8+577		85/01/23. 08.10.44		PAGE
VARIABLES	SN	TYPE										5
337	IS12	* INTEGER	*UNDEF	ARRAY	CTAPES	REFS	158	42	49	DEFINED	54	55
0	ITAPES	* INTEGER	ARRAY			REFS	34					56
255	J	INTEGER	*UNDEF			REFS	57	58	DEFINED	69		
330	JATRAN	* INTEGER	*UNDEF			REFS	70					
256	UDSRN	INTEGER	INTEGER			REFS	116					
332	UDTRAN	* INTEGER	*UNDEF			REFS	83					
260	USCR	INTEGER	INTEGER	ARRAY	DSRN	REFS	85	87	89	DEFINED	108	170
0	JSETUP	INTEGER	INTEGER			REFS	34	36	36	DEFINED	174	175
331	JWTRAN	* INTEGER	*UNDEF			REFS	177					
341	KDSRN	* INTEGER	*UNDEF			REFS	118					
0	KFILES	INTEGER	INTEGER	CFILES	F.P.	REFS	72					
0	KNINIT	INTEGER	INTEGER	*UNDEF		REFS	41					
340	KOR	* INTEGER	INTEGER			REFS	48					
265	KSCR	INTEGER	INTEGER	SUM		REFS	159					
3	LDF	INTEGER	INTEGER	SUM		REFS	110					
263	LDSRN	INTEGER	INTEGER	SUM		REFS	39					
2	LDT	INTEGER	INTEGER	SUM		REFS	99					
5	LMF	INTEGER	INTEGER	SUM		REFS	39					
4	LMT	INTEGER	INTEGER	SUM		REFS	39					
266	LSCR	INTEGER	INTEGER	SUM		REFS	112					
1	LSF	INTEGER	INTEGER	SUM		REFS	39					
0	LST	INTEGER	INTEGER	SUM		REFS	39					
245	MATXC1	INTEGER	INTEGER	SUM		REFS	125					
246	MATXC2	INTEGER	INTEGER	SUM		REFS	126					
247	MATXM1	INTEGER	INTEGER	SUM		REFS	133					
250	MATXM2	INTEGER	INTEGER	SUM		REFS	134					
251	MATXS1	INTEGER	INTEGER	SUM		REFS	149					
252	MATXS2	INTEGER	INTEGER	SUM		REFS	150					
261	MDSRN	INTEGER	INTEGER	SUM		REFS	91					
253	MEMOUT	INTEGER	INTEGER	SUM		REFS	153					
243	MPOS	INTEGER	INTEGER	SUM		REFS	69					
267	MSCR	INTEGER	INTEGER	SUM		REFS	114					
242	MTAPES	INTEGER	INTEGER	SUM		REFS	52					
262	NDSRN	INTEGER	INTEGER	SUM		REFS	97					
270	NSCR	INTEGER	INTEGER	SUM		REFS	181					
333	NIAERO	INTEGER	INTEGER	SUM		REFS	168					
324	NTAPD1	INTEGER	INTEGER	SUM		REFS	164					
273	NTAPBC	INTEGER	INTEGER	SUM		REFS	129					
271	NTAPC	INTEGER	INTEGER	SUM		REFS	127					
312	NTAPD	INTEGER	INTEGER	SUM		REFS	145					
315	NTAPDC	INTEGER	INTEGER	SUM		REFS	147					
303	NTAPDD	INTEGER	INTEGER	SUM		REFS	139					
311	NTAPES	INTEGER	INTEGER	SUM		REFS	143					
305	NTAPIS	INTEGER	INTEGER	SUM		REFS	160					
301	NTAPK	INTEGER	INTEGER	SUM		REFS	137					
275	NTAPL	INTEGER	INTEGER	SUM		REFS	131					
254	NTAPLT	INTEGER	INTEGER	SUM		REFS	156					
277	NTAPM	INTEGER	INTEGER	SUM		REFS	135					
317	NTAPS	INTEGER	INTEGER	SUM		REFS	151					
307	NTAPST	INTEGER	INTEGER	SUM		REFS	141					
320	NTAPT	INTEGER	INTEGER	SUM		REFS	154					
326	NTTRAN	INTEGER	TNTFGR	SUM		REFS	166					



SUBROUTINE LTABLE 74/74 OPT=1

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```
1      C45700, SUB. LTABLE (LIST TABLE OF CONTENTS)          LTABLE 2
      C      SUBROUTINE LTABLE (ITAPEW,KROUPD)             LTABLE 3
      C      INTEGER WIDTHA                            LTABLE 4
      C
      C      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C      DOUBLE PRECISION DUMMY1,DUMMY2,DUMMY3           LTABLE 5
      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C
      C      DIMENSION CPAR(2)                                LTABLE 6
      C      DIMENSION EQU(100)                               LTABLE 7
      C      DIMENSION FMT(10)                                LTABLE 8
      C      DIMENSION TEXT(18)                               LTABLE 9
      C      DIMENSION XN(2)                                 LTABLE 10
      C
      C      COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST ,KLABEL ,KTPAGE ,NPAGEA
      1      ,KBPAGE ,LINESG ,KOUNTH ,KOUNTI                LTABLE 11
      C      COMMON /CTITLE/ LDUMMY ,TEXT                   LTABLE 12
      C      COMMON /COMPUT/ KOMPUT ,NCHARW                 LTABLE 13
      C      COMMON /CTABLE/ KTABLE ,NPASSD ,NROWSD ,NCOLSD ,NCOLST ,KTABLO ,NPAGEA
      1      ,ITAPET ,LTMH ,TMH                           LTABLE 14
      C      COMMON /CTMH / KTMH ,LTMH ,TMH                 LTABLE 15
      C      COMMON /CONSTS/ NO ,YES                         LTABLE 16
      C
      C      EQUIVALENCE (EQU(1),KROUP ), (EQU(2),KLAST ), (EQU(3),NCHAR )
      1      ,(EQU(4),NPASS ), (EQU(5),NROWS ), (EQU(6),NCOLS )       LTABLE 17
      2      ,(EQU(7),NPAGET ), (EQU(8),NWORDS ), (EQU(9),CHAR(1))     LTABLE 18
      C
      C      IF (KTABLO .EQ. 1) GO TO 900
      C
      C      C INITIAL CONDITIONS
      C      DATA BLANK /1H /
      C
      C      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C      DATA DOTS /4H.../                                LTABLE 19
      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C
      C      CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
      C      DATA DOTS /10H.../                                LTABLE 20
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
      C
      C      DATA OPAR /4H(9X.,/
      C      DATA X /4HX, /                                LTABLE 21
      C      DATA A /4HA /                                LTABLE 22
      C      DATA C1A /4H.1A /                            LTABLE 23
      C      DATA XN /4H.12X.4H.2X./                      LTABLE 24
      C      DATA CPAR /4H )4H215/                        LTABLE 25
      C      DATA FNUM /2H 1.2H 2.2H 3.2H 4.2H 5.2H 6.2H 7.2H 8.2H 9.2H10
      1      ,2H11,2H12,2H13,2H14,2H15/                  LTABLE 26
      C      KROUP = KROUPD
      C      IF .(KROUP .EQ.0) GOTO 50
      C      KROUP = 0
      C      NWORDS = 15
      C
      C      LTABLE 27
      C      LTABLE 28
      C      LTABLE 29
      C      LTABLE 30
      C      LTABLE 31
      C      LTABLE 32
      C      LTABLE 33
      C      LTABLE 34
      C      LTABLE 35
      C      LTABLE 36
      C      LTABLE 37
      C      LTABLE 38
      C      LTABLE 39
      C      LTABLE 40
      C      LTABLE 41
      C      LTABLE 42
      C      LTABLE 43
      C      LTABLE 44
      C      LTABLE 45
      C      LTABLE 46
      C      LTABLE 47
      C      LTABLE 48
      C      LTABLE 49
      C      LTABLE 50
      C      LTABLE 51
      C      LTABLE 52
      C      LTABLE 53
      C      LTABLE 54
      C      LTABLE 55
      C      LTABLE 56
      C      LTABLE 57
      C      LTABLE 58
```

SUBROUTINE LTABLE 74/74 OPT-1  
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```

      MAXV = NWORDS + 8          59
      WRITE (ITAPET) MAXV, KROUP, KLAST, NCHAR, NPASS, NROWS, NCOLS   LTABLE
      1     ,NPAGE, NWORDS, (CHAR(N), N=1,NWORDS)   LTABLE
      2     ,DUMMY1,DUMMY2,DUMMY3   LTABLE
  50 CONTINUE
      REWIND ITAPET
      KOUNT = LINES
      C
      C LIST TABLE OF CONTENTS
      C
  100 CONTINUE
      READ (ITAPET) MAXV, (EQUIE), IE=1,MAXV), DUMMY1, DUMMY2,DUMMY3
      IF (KROUP .EQ. 0) GO TO 900
      IF (KROUP .NE. 1) GO TO 100
      LTEXT = 18
  150 DO 150 L=1,LTEXT
      IF (KLAST .EQ. 1) TEXT(L) = BLANK
      IF (KLAST .EQ. 2) TEXT(L) = DOTS
  150 CONTINUE
      DO 170 L=1,NWORDS
  170 TEXT(L)= CHAR(L)
      KOEFA = (NCOLST - NCOLS)/NCHARW
      WIDTHA = (NCOLST - NCOLS) - KOEFA*NCHARW
      KOEFX = 1 + NCOLS
      LTEXT = KOEFA
      FMT( 1)= OPAR
      FMT( 2)= FNUM(KOEFX)
      FMT( 3)= X
      FMT( 4)= FNUM(KOEFA)
      FMT( 5)= A
      FMT( 6)= FNUM(NCHARW)
      FMT( 7)= BLANK
      FMT( 8)= BLANK
      IF (WIDTHA .EQ. 0) GO TO 175
      LTEXT = LTEXT + 1
      FMT( 7)= CIA
      FMT( 8)= FNUM(WIDTHA)
  175 CONTINUE
      XN(KLAST)
      FMT( 9)= CPAR(KLAST)
      FMT(10)= CPAR(KLAST)
      KOUNT = KOUNT + NROWS
      CALL TITLES (1)
      IF (KOUNT .GT. 3*(KTMH-N0)) GO TO 180
      WRITE (ITAPEW,100)
      NROWS = 2
      KOUNT = KOUNT + NROWS + 1
  180 KOUNT = KOUNT + 1
      CALL PLB (1,NROWS,ITAPEW)
      GO TO (200, 300), KLAST
  200 WRITE (ITAPEW,FMT ) (TEXT(L), L=1,LTEXT)
      GO TO 400
  300 WRITE (ITAPEW,FMT ) (TEXT(L), L=1,LTEXT), NPASS, NPAGET
  400 CONTINUE
      GO TO 100
  900 CONTINUE
      KROUP = KROUP
  
```

```

      SUBROUTINE LTABLE      74/74    OPT=1
      C
      C FORMATS
      C
      1000 FORMAT (10X, 20(1H*)
      1          ,1OH PASS PA
      C
      C RETURN
      END

```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM  
107 I ANTE STATEMENT MAY BE

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES						
3 LTABLE	3	122						
VARIABLES	SN	TYPE	RELOCATION					
174	A	REAL		REFS	88	DEFINED	48	
170	BLANK	REAL		REFS	75	90	91	36
277	CHAR	REAL	ARRAY	REFS	12	27	59	
433	CPAR	REAL	ARRAY	REFS	12	98	DEFINED	
175	C1A	REAL		REFS	94	DEFINED	49	
171	DOTS	REAL		REFS	76	DEFINED	43	
257	DUMMY1	REAL		REFS	59	DEFINED	70	
260	DUMMY2	REAL		REFS	59	DEFINED	70	
261	DUMMY3	REAL		REFS	59	DEFINED	70	
267	EQU	REAL	ARRAY	REFS	13	9*27	DEFINED	
435	FMT	REAL	ARRAY	REFS	14	108	110	
447	FNUM	REAL	ARRAY	REFS	87	88	89	
262	IE	INTEGER		REFS	98	90	91	
7	ITAPET	INTEGER	C TABLE	REFS	14	85	87	
0	IIAPEW	INTEGER	F.P.	REFS	22	I/O REFS	70	
7	KBPAGE	INTEGER	CLIST	REFS	106	DEFINED	3	
4	KLABEL	INTEGER	CLIST	REFS	18	I/O REFS	102	
270	KLAST	INTEGER	CLIST	REFS	18	DEFINED	3	
265	KOEFA	INTEGER		REFS	27	59	75	
266	KOEFX	INTEGER		REFS	81	83	87	
0	KOMPUT	INTEGER	COMPUT	REFS	85	DEFINED	82	
0	KOUNT	INTEGER	CLIST	REFS	21	99	101	
11	KOUNTH	INTEGER	DEFINED	REFS	18	104	105	
12	KOUNTI	INTEGER	CLIST	REFS	18			
1	KPAGE	INTEGER	CLIST	REFS	18			

VARIABLES	SN	TYPE	RELOCATION	DEFINED	54	56	3	114
0 KROUD		INTEGER	F.P.	REFS	54	DEFINED	3	114
0 KTABLE		INTEGER	CTABLE	REFS	22			
5 KTABLO		INTEGER	CTABLE	REFS	22	31		
0 KTMH		INTEGER	CTMH	REFS	24	101		
5 KTPAGE		INTEGER	CLIST	REFS	18			
264 L		INTEGER	CLIST	REFS	75	76	2*79	110
0 LDUMMY		INTEGER	CTITLE	REFS	74	78	108	110
2 LINES		INTEGER	CLIST	REFS	20			
10 LINESG		INTEGER	CLIST	REFS	18	64		
3 LINEST		INTEGER	CLIST	REFS	18			
263 LTEXT		INTEGER	CLIST	REFS	74	93	108	110
1 LTMH		INTEGER	CTMH	REFS	24			
255 MAXV		INTEGER	CTMH	REFS	59	70	DEFINED	58
256 N		INTEGER	CTMH	REFS	59		DEFINED	59
271 NCHAR		INTEGER	COMPUT	REFS	27	59		
1 NCHARW		INTEGER	COMPUT	REFS	21	80	81	89
274 NCOLS		INTEGER	CTABLE	REFS	27	59	80	81
3 NCOLSD		INTEGER	CTABLE	REFS	22	80		
4 NCOLST		INTEGER	CONSTS	REFS	25	101		
0 NO		INTEGER	CONSTS	REFS	18	59		
6 NPAGE		INTEGER	CTABLE	REFS	22			
6 NPAGEA		INTEGER	CTABLE	REFS	27	110		
275 NPAGET		INTEGER	CTABLE	REFS	27	59		
272 NPASS		INTEGER	CTABLE	REFS	22			
1 NPASSD		INTEGER	CTABLE	REFS	22			
273 NROWS		INTEGER	DEFINED	REFS	27	59	99	104
2 NROWSD		INTEGER	CTABLE	REFS	22			
276 NWORDS		INTEGER	CTABLE	REFS	27	58	2*59	57
172 OPAR		REAL	ARRAY	REFS	84	DEFINED	46	
1 TEXT		REAL	ARRAY	REFS	15	20	108	110
2 TMH		REAL	ARRAY	CTMH	79			
254 WIDTHA		INTEGER	REAL	REFS	5	24		
173 X		REAL	REAL	REFS	86	92	DEFINED	81
466 XN		REAL	REAL	REFS	16	97	DEFINED	47
1 YES		REAL	REAL	REFS	25		DEFINED	50
VARIABLES USED AS FILE NAMES. SEE ABOVE								
EXTERNALS								
PLB TITLES								
20 50		TYPE	ARGS	REFERENCES	62	55		
24 100			3	106	69	72	112	
0 150			1	100	77	74		
0 170					79	78		
110 175					96	92		
127 180					105	101		
142 200					108	107		
150 300					110	107		
155 400					111	109		
156 400					112	111		
					71	71		

## STATEMENT LABELS

DEF LINE REFERENCES

REFERENCES

DEF LINE REFERENCES

REFERENCES

SUBROUTINE LTABLE		74/74	OPT=1			
STATEMENT LABELS		DEF LINE		REFERENCES		
244	1000	FMT	119	102		
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
45	150	L	74 77	58	INSTACK	
56	170	L	78 79	38	INSTACK	
COMMON BLOCKS		LENGTH	MEMBERS - BIAS NAME(LENGTH)			
CLIST		11	0 KOUNT	(1)	1 KPAGE	(1)
			3 LINEST	(1)	4 KLABEL	(1)
			6 NPAGE	(1)	7 KBPAGE	(1)
			9 KOUNTH	(1)	10 KOUNTI	(1)
CTITLE		19	0 LDUMMY	(1)	1 TEXT	(18)
COMPUT		2	0 KOMPUT	(1)	1 NCHARW	(1)
CTABLE		8	0 KTABLE	(1)	1 NPASSD	(1)
			3 NCOLSD	(1)	4 NCOLST	(1)
CTMH		38	6 NPAGEA	(1)	7 ITAPET	(1)
CONSTS		2	0 KTMH	(1)	1 LTMH	(1)
			0 NO	(1)	1 YES	(1)
EQUIV CLASSES		LENGTH	MEMBERS - BIAS NAME(LENGTH)			
EQU		100	0 KROUP	(1)	1 KLAST	(1)
			3 NPASS	(1)	2 NCHAR	(1)
			6 NPAGET	(1)	5 NCOLS	(1)
					7 NWORDS	(1)
					8 CHAR	(15)
STATISTICS						
PROGRAM LENGTH			470B	312		
CM LABELED COMMON LENGTH			120B	80		
5200OB CM USED						

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74/74 OPT=1

C45700

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PAGE 1

```
1      C45700, SUB. LLABEL (LIST TABLE FOR INPUT-OUTPUT LABELS)
C      ****
C      **** SUBROUTINE LLABEL ****
C      **** COMPUTER VERSION ****
C      **** IBM COMPUTER PROGRAM VERSION ****
C
10     C      FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED
C      BY CIBM IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE IBM
C      COMPUTER AND SHOULD BE LEFT BLANK.
C
15     C      CDC COMPUTER PROGRAM VERSION
C
C      FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED
C      BY CIBM IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE IBM
C      COMPUTER AND SHOULD HAVE A C IN COLUMN ONE.
C
20     C
C      ****
C      **** SUBROUTINE LLABEL (ITAPEW,KROUPD,KBLAB)
C
25     C      BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      DOUBLE PRECISION PNAME ,CNAME ,UNITNA
C      ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
C      DIMENSION IOS(100)          .IOSUM(100)
C      DIMENSION EQU(100)
C      DIMENSION FILENA(2)
C      DIMENSION TMH(18,2)
C
C      COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST ,KLABEL ,KTPAGE ,NPAGE
1      COMMON /LABELS/ KPAGE ,LINESG ,KOUNTH ,KOUNTI
1      COMMON /LABELS/ KFLABO ,KDLABI ,KFLABI ,KDLABI ,ITAPEL
COMMON /CTMH / KTMH ,LTMH ,TMH
COMMON /CONSTS/ NO ,YES
C
C      EQUIVALENCE (EQU(1),KROUP ), (EQU(2),NTAPE ); (EQU(3), FILENA(1))
1      (EQU(5),NFILE); (EQU(6),IROWS ); (EQU(7),JCOLS )
2      ,(EQU(8),NPAGET), (EQU(9),TSIO)
C
40     IF (KFLABO .EQ. 1 .AND. KDLABO .EQ. 1) GO TO 950
C
45     C      INITIAL CONDITIONS
C
C      DATA FSIO   /4HFSIO/
C      DATA DSIO   /4HDSIO/
50     KLABT = (KFLABI-1) + (KDLABI-1)
      KROUP = KROUP
      NIOS = 100
      DO 40 I0=1,NIOS
      IOSUM(I0) = 0
40    IOS(I0)= 0
      IF (KROUP .EQ. 0) GOTO 50
```

SUBROUTINE LLABEL

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PAGE 2

```

KROUP = 0
MAXV = 9
WRITE (ITAPEL) MAXV,KROUP,NTAPE,FILENA,NFILE,IROWS,JCOLS,NPAGE
1      ,TSIO,PNAME,CNAME,UNITNA
50 CONTINUE
C
C LIST INPUT-OUTPUT MATRIX LABELS AS GENERATED WITHIN THE PROGRAM
C

```

```

KLAB = 0
KLAB = KLAB + 1
REWIND ITAPEL
KOUNT = LINES
100 CONTINUE
READ (ITAPEL) MAXV, (EQU(IE), IE=1,MAXV), PNAME, CNAME, UNITNA
IF (KROUP .EQ. 0) GO TO 200
IF (KROUP .NE. 2) GO TO 100
IF (KBLAB .EQ. 2) GO TO 150
IF (KLAB .GT. 1) GO TO 110
IF (KFLABI .EQ. 1) GO TO 110
IF (KLAB .EQ. 1 .AND. TSIQ .EQ. FSIO) GO TO 150
GO TO 100
110 CONTINUE
IF (KDLABI .EQ. 1) GO TO 230
IF (KLAB .EQ. KLABT .AND. TSIQ .EQ. DSIO) GO TO 150
GO TO 100
150 CONTINUE
IOS(NTAPE) = NTAPE
IOSUM(NTAPE) = IOSUM(NTAPE) + 1
CALL TITLES (1)
IF (KOUNT .GT. 3*(KTMH-NO)) GO TO 180
WRITE (ITAPEW,1000)
CALL PLB (1,1,ITAPEW)
WRITE (ITAPEW,1100)
CALL PLB (1,1,ITAPEW)
KOUNT = KOUNT + 5
180 KOUNT = KOUNT + 1
WRITE (ITAPEW,1200) PNAME,CNAME,UNITNA,FILENA,NTAPE,NFILE
1      ,IROWS,JCOLS,NPAGET
GO TO 100
200 CONTINUE
C
IF (KBLAB .EQ. 2) GO TO 230
IF (KLAB .LT. KLABT) GO TO 75
230 CONTINUE
C
C LIST INPUT-OUTPUT MATRIX LABELS IN NUMERICAL ORDER OF I/O UNITS
C
KOUNT = LINES
DO 450 IO=1,NIOS
IF (IOSUM(IO) .EQ. 0) GO TO 450
KLAB = 0
275 CONTINUE
KLAB = KLAB + 1

```

```

LLABEL 59
LLABEL 60
LLABEL 61
LLABEL 62
LLABEL 63
LLABEL 64
LLABEL 65
LLABEL 66
LLABEL 67
LLABEL 68
LLABEL 69
LLABEL 70
LLABEL 71
LLABEL 72
LLABEL 73
LLABEL 74
LLABEL 75
LLABEL 76
LLABEL 77
LLABEL 78
LLABEL 79
LLABEL 80
LLABEL 81
LLABEL 82
LLABEL 83
LLABEL 84
LLABEL 85
LLABEL 86
LLABEL 87
LLABEL 88
LLABEL 89
LLABEL 90
LLABEL 91
LLABEL 92
LLABEL 93
LLABEL 94
LLABEL 95
LLABEL 96
LLABEL 97
LLABEL 98
LLABEL 99
LLABEL 100
LLABEL 101
LLABEL 102
LLABEL 103
LLABEL 104
LLABEL 105
LLABEL 106
LLABEL 107
LLABEL 108
LLABEL 109
LLABEL 110
LLABEL 111
LLABEL 112
LLABEL 113
LLABEL 114

```

```

115      300 CONTINUE
          IF (IOSUM(10) .EQ. 0) GO TO 450
          READ (ITAPEL) MAXV, (EQUI1E), IE=1, MAXV, PNAME, CNAME, UNITNA
          IF *(KROUP .EQ. 0) GO TO 400
          IF *(KROUP .NE. 2) GO TO 300
          IF (KBLAB .EQ. 2) GO TO 350
          IF (KBLAB .GT. 1) GO TO 310
          IF (KFLABI .EQ. 1) GO TO 310
          IF (KLAB .EQ. 1 .AND. TSI0 .EQ. FSIO) GO TO 350
          GO TO 300
310      CONTINUE
          IF (KDLABI .EQ. 1) GO TO 430
          IF (KLAB .EQ. KLABT .AND. TSI0 .EQ. DSIO) GO TO 350
          GO TO 300
350      CONTINUE
          NTAPEA = IOS(10)
          IF (NTAPEA .NE. NTAPE) GO TO 300
          IOSUM(10) = IOSUM(10) - 1
          CALL TITLES (1)
          IF (KOUNT .GT. 3*(KTMH-ND)) GO TO 380
          WRITE (ITAPEW,1010)
          CALL PLB (1,1,ITAPEW)
          WRITE (ITAPEW,1100)
          CALL PLB (1,1,ITAPEW)
          KOUNT = KOUNT + 5
380      KOUNT = KOUNT + 1
          WRITE (ITAPEW,1200) PNAME, CNAME, UNITNA, FILENA, NTAPE, NFILE
          1           ,IROWS, JCOLS, NPGET
          GO TO 300
400      CONTINUE
C
          IF (KBLAB .EQ. 2) GO TO 430
          IF (KLAB .LT. KLABT) GO TO 275
430      CONTINUE
450      CONTINUE
        KROUPD = 0
        950 CONTINUE
C FORMATS
1000      FORMAT (10X, 18HWITHIN THE PROGRAM)
        1
1100      FORMAT (10X,
          1 30HCALLING CALLED UNIT FILE ,/, 10X,
          2 57HPROGRAM PROGRAM NAME NAME UNIT FILE ROWS COLS
          3.11X. 4HPAGE)
1010      FORMAT (10X, 51HINPUT-OUTPUT MATRIX LABELS IN NUMERICAL ORDER OF 1/
          1           ,7H0 UNITS)
1200      FORMAT (10X, 1A8, 2X, 1A6, 3X, 1A6, 1X, 2A4, 2X, 114, 1X, 1I4, 216
          1           ,11X, 1I4)
C
        RETURN
        END
145
155
160
165

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS 3	LLABEL	DEF LINE 23	REFERENCES 165	RELOCATION	REFS	96	141	DEFINED 50	73	117
430	CNAME	REAL		REFS	83	127	DEFINED	73	117	
250	DSIO	REAL		REFS	30	8*40	DEFINED	73	117	
426	EQU	REAL	ARRAY	REFS	31	40	DEFINED	60	96	141
437	FILENA	REAL	ARRAY	REFS	79	123	DEFINED	49	96	
247	FS10	REAL		REFS	73	117	DEFINED	73	117	
433	IE	INTEGER		REFS	55	56	DEFINED	110	116	2*132
425	IO	INTEGER		DEFINED	54	109				
601	IOS	INTEGER	ARRAY	REFS	29	130	DEFINED	56	86	
745	IOSUM	INTEGER	ARRAY	REFS	29	87	DEFINED	116	132	
442	IROWS	INTEGER		DEFINED	55	87	DEFINED	132		
4	ITAPEL	INTEGER		REFS	40	60	96	141		
0	ITAPEW	INTEGER		REFS	36	1/O REFS	60	136	138	DEFINED
443	JCOLS	INTEGER		REFS	91	93	DEFINED	136	23	
0	KBLAB	INTEGER		REFS	90	92	96	135	137	141
7	KBPAGE	INTEGER		REFS	40	60	96	141		
3	KDLABI	INTEGER		REFS	76	101	120	146	146	DEFINED
1	KDLABO	INTEGER		REFS	34					
2	KFLABI	INTEGER		REFS	36	51	82	126		
0	KFLABO	INTEGER		REFS	36	44				
432	KLAB	INTEGER		REFS	36	51	78	122		
4	KLABEL	INTEGER		REFS	69	77	102	127	147	DEFINED
423	KLABT	INTEGER		REFS	34	89	94	102	147	DEFINED
0	KOUNT	INTEGER		REFS	83	102	127	67	69	51
11	KOUNTH	INTEGER		REFS	34	89	95	134	139	140
12	KOUNTI	INTEGER		REFS	34	94	108	139	140	
1	KPAGE	INTEGER		REFS	34	57	60	75	75	118
435	KROUP	INTEGER		REFS	34	58	60	74	75	119
0	KROUPD	INTEGER		REFS	52	52	DEFINED	23	150	
0	KTMH	INTEGER		REFS	37	89	134			
5	KTPAGE	INTEGER		REFS	34					
2	LINES	INTEGER		REFS	34	71	108			
10	LINESG	INTEGER		REFS	34					
3	LINEST	INTEGER		REFS	34					
1	LTMH	INTEGER		REFS	37					
426	MAXV	INTEGER		REFS	60	73	117	DEFINED	59	73
441	NFILE	INTEGER		REFS	40	60	96	141		
424	NIOS	INTEGER		REFS	54	109	DEFINED	53		
0	NO	INTEGER		REFS	38	89	134			
6	NPAGE	INTEGER		REFS	34	60				
444	NPAGET	INTEGER		REFS	40	96	141			
436	NTAPE	INTEGER		REFS	40	60	2*86	2*87	96	131
434	NTAPEA	INTEGER		REFS	131	130	DEFINED	141	141	141
427	PNAME	REAL	ARRAY	REFS	60	96	DEFINED	73	117	
2	TMH	REAL	ARRAY	REFS	32	37				

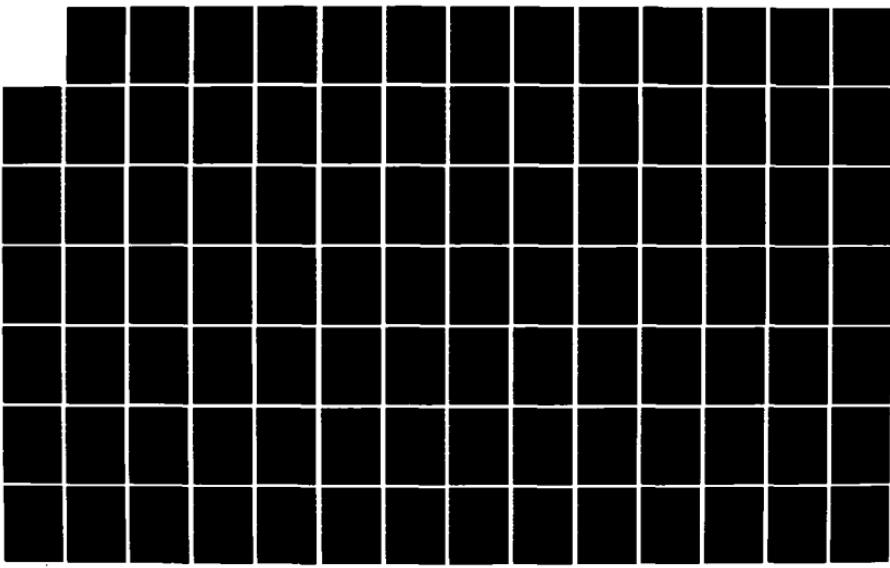
AD-A152 270

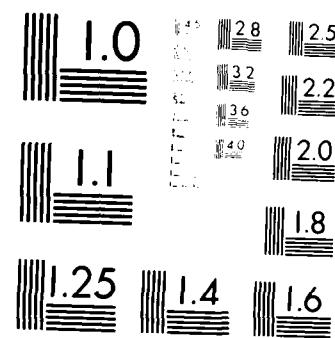
ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER  
PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J 8 SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1  
UNCLASSIFIED N00019-81-C-0395

2/8

F/G 9/2

NL





MICROCOPY RESOLUTION TEST CHART  
Nikon Microscopy USA, Inc., Melville, NY 11747



SUBROUTINE FSIOFO 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 1  
 1 C457000 SUB. FSIOFO (FORTRAN SEQUENTIAL I/O FOR FLUTTER OPTIMIZATION)  
 C SUBROUTINE FSIOFO FSIOFO 2  
 C CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS FSIOFO 3  
 C DOUBLE PRECISION FSIONS FSIOFO 4  
 C DOUBLE PRECISION FDVIBA,FAICFA FSIOFO 5  
 C CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS FSIOFO 6  
 C FSIOFO 7  
 C CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 8  
 C DIMENSION IFILES(1) FSIOFO 9  
 C CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 10  
 C DIMENSION KLUE(80),FSIONS(20),ITAPES(50) FSIOFO 11  
 C DIMENSION NFUF(20,3) FSIOFO 12  
 C CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 13  
 C COMMON /CFILES/KFILES,IFILES FSIOFO 14  
 C CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 15  
 C FSIOFO 16  
 C FSIOFO 17  
 C CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 18  
 C COMMON /CFILES/KFILES,IFILES FSIOFO 19  
 C CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 20  
 C FSIOFO 21  
 C COMMON /FSI01/LFUF,LFLUD,NFUF FSIOFO 22  
 C COMMON /FSI02/FSIONS FSIOFO 23  
 C COMMON /CTAPES/ITAPES FSIOFO 24  
 C COMMON /COMRWP/ITAPER,ITAPEW,ITAPEP FSIOFO 25  
 C COMMON /CLUEM/LKLU E,KLUE FSIOFO 26  
 C FSIOFO 27  
 C FSIOFO 28  
 C FSIOFO 29  
 C FSIOFO 30  
 C FSIOFO 31  
 C DATA FDVIBA/8HIDVIBA/ FSIOFO 32  
 C DATA FAICFA/8HIAICFA/ FSIOFO 33  
 C DO 100 I=1,50 FSIOFO 34  
 C FSIOFO 35  
 C CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 36  
 C ITAPES(I) = 1 FSIOFO 37  
 C CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FSIOFO 38  
 C FSIOFO 39  
 C ITAPES(I) = 1 FSIOFO 40  
 C 100 CONTINUE FSIOFO 41  
 C LFUF = 2 FSIOFO 42  
 C LFUD = 20 FSIOFO 43  
 C KANAV = KLUE(3) FSIOFO 44  
 C FSIOFO 45  
 C FSIOFO 46  
 C ENTER CARD DATA FSIOFO 47  
 C FSIOFO 48  
 C KFSIO = NO FSIOFO 49  
 C IF (KFSIO .EQ. NO) GO TO 200 FSIOFO 50  
 C READ (ITAPER,1000) IDVIBA,JDVIBA,KDVIBA,JAICFA,JAICFA,KAICFA FSIOFO 51  
 C 200 CONTINUE FSIOFO 52  
 C FSIOFO 53  
 C FSIOFO 54  
 C FSIOFO 55  
 C TRANSFER I/O DATA FROM NONSUBSCRIPTED TO SUBSCRIPTED VARIABLES FSIOFO 56  
 C IDVIBA = 17 FSIOFO 57  
 C FSIOFO ...

SUBROUTINE FSIOFO 74/74 OPT=1

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```

KOVIBA = 1
IAICFA = 0
JAICFA = 0
KAICFA = 0
IF (KANAV .EQ. 2) JDVIBA = 0
FSIONS( 1) = FDVIBA
NFUF( 1,1) = IDVIBA
NFUF( 1,2) = JDVIBA
NFUF( 1,3) = KDVIBA
FSIONS( 2) = FAICFA
NFUF( 2,1) = IAICFA
NFUF( 2,2) = JAICFA
NFUF( 2,3) = KAICFA
C
C FORMATS
C 1000 FORMAT ( 4(1I4,2I3))
C
      RETURN
      END

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES	RELOCATION	REFS	DEFINED	32
	1	FSIOFO	3	77	REFS	63	31
VARIABLES	SN	TYPE			REFS	14	23
44	FAICFA	REAL			REFS	36	2*39
43	FDVIBA	REAL	ARRAY	FSIO2	REFS	68	DEFINED
0	FSIONS	REAL			REFS	64	50
62	I	INTEGER			REFS	12	19
71	IAICFA	INTEGER			REFS	25	1/O REFS
66	IDVIBA	INTEGER	CFILES	COMRWP	REFS	14	24
1	IFILES	INTEGER	ARRAY	COMRWP	REFS	25	DEFINED
2	ITAPEP	INTEGER		COMRWP	REFS	14	39
0	ITAPER	INTEGER	ARRAY	CTAPES	REFS	25	DEFINED
0	ITAPES	INTEGER		COMRWP	REFS	69	50
1	ITAPEW	INTEGER		COMRWP	REFS	65	57
72	JAICFA	INTEGER			REFS	70	50
67	JDVIBA	INTEGER			REFS	62	DEFINED
73	KAICFA	INTEGER			REFS	66	50
63	KANAV	INTEGER			REFS	19	43
70	KOVIBA	INTEGER	CFILES	REFS	49	DEFINED	48
0	KFILES	INTEGER			REFS	14	26
64	KFSIO	INTEGER	ARRAY	CLUEM	REFS	22	43
1	KLUE	INTEGER		FSIO1	REFS	22	DEFINED
0	LFUF	INTEGER		FSIO1	REFS	22	41
1	LUFUD	INTEGER		CLUEM	REFS	26	DEFINED
0	LKLUE	INTEGER	ARRAY	FSIO1	REFS	15	42
2	NFUF	INTEGER		69	70	22	DEFINED
65	NO	INTEGER	*UNDEF		REFS	48	61

SUBROUTINE FSIOFO

74/74

OPT=1

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PAGE 3

VARIABLES SN TYPE  
VARIABLES USED AS FILE NAMES. SEE ABOVE

STATEMENT LABELS

DEF LINE REFERENCES

O 100	40	33
20 200	51	49
57 1000	75	50

LOOPS LABEL INDEX

FROM-TO LENGTH

PROPERTIES  
INSTACK  
33 40 38

COMMON BLOCKS LENGTH

MEMBERS - BIAS NAME(LENGTH)

CFILES 2	0 KFILES (1)	1 IFILES (1)
FSIO1 62	0 LFUF (1)	1 LFUD (1)
FSIO2 20	0 FSIDS (20)	
CTAPES 50	0 ITAPES (50)	
COMRWP 3	0 ITAPER (1)	1 ITAPEW (1)
CLUEM 81	0 LKLU (1)	1 KLUE (80)

STATISTICS

PROGRAM LENGTH  
CM LABELED COMMON LENGTH  
5200008 CM USED

74B 60  
332B 218



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SUBROUTINE DSIOFO 74/74 OPT=1          FTN 4.8+577   85/01/23. 08.10.44   PAGE 2
      NDUF( 1,1) = LFLEX
      NDUF( 1,2) = MFLEX
      NDUF( 1,3) = NFLEX
      DSIONS( 2) = DSTIFF
      NDUF( 2,1) = LSTIFF
      NDUF( 2,2) = MSTIFF
      NDUF( 2,3) = NSTIFF
      DSIONS( 3) = DDEFLS
      NDUF( 3,1) = LDEFLS
      NDUF( 3,2) = MDEFLS
      NDUF( 3,3) = NDEFLS
      DSIONS( 4) = DMEMBS
      NDUF( 4,1) = LMEMBS
      NDUF( 4,2) = MMEMBS
      NDUF( 4,3) = NMEMBS
      DSIONS( 5) = DESTIF
      NDUF( 5,1) = LESTIF
      NDUF( 5,2) = MESTIF
      NDUF( 5,3) = NESTIF
      C
      C FORMATS
      C FORMAT ( 4(1I4,2I3) )
      C
      RETURN
      END

```

```

DSIOFO 59
DSIOFO 60
DSIOFO 61
DSIOFO 62
DSIOFO 63
DSIOFO 64
DSIOFO 65
DSIOFO 66
DSIOFO 67
DSIOFO 68
DSIOFO 69
DSIOFO 70
DSIOFO 71
DSIOFO 72
DSIOFO 73
DSIOFO 74
DSIOFO 75
DSIOFO 76
DSIOFO 77
DSIOFO 78
DSIOFO 79
DSIOFO 80
DSIOFO 81
DSIOFO 82
DSIOFO 83
DSIOFO 84

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES			
1	DSIOFO	3	82			
VARIABLES	SN	TYPE	RELOCATION			
41	DDEFLS	REAL		REFS 65	DEFINED 22	
43	DESTIF	REAL		REFS 73	DEFINED 24	
37	DFLEX	REAL		REFS 57	DEFINED 20	
42	DMEMBS	REAL		REFS 69	DEFINED 23	
0	DSIONS	REAL	ARRAY DSIOFO	REFS 10	DEFINED 15	
40	DSTIFF	REAL		REFS 73	DEFINED	
2	ITAPEP	INTEGER	COMRWP	REFS 61	DEFINED 21	
0	ITAPER	INTEGER	COMRWP	REFS 13	I/O REFS 33	
1	ITAPEW	INTEGER	COMRWP	REFS 13		
72	KOSIO	INTEGER		REFS 32	DEFINED 31	
102	LDEFLS	INTEGER		REFS 66	DEFINED 33	48
0	LDUF	INTEGER	DSIOFO	REFS 14	DEFINED 25	
1	LOUDF	INTEGER	DSIOFO	REFS 14	DEFINED 26	
110	LESTIF	INTEGER		REFS 74	DEFINED 33	54
74	LFLEX	INTEGER		REFS 58	DEFINED 33	42
105	LMEMBS	INTEGER		REFS 70	DEFINED 33	51
77	LSTIFF	INTEGER		REFS 62	DEFINED 33	45
103	MDEFLS	INTEGER		REFS 67	DEFINED 33	49
111	MESTIFF	INTEGER	TNTFCRP	REFS 75	DEFINED	55





## VARIABLES SN TYPE

	SN	TYPE	RELOCATION	
64	DUMMY	3 * REAL	*UNDEF	
7	ITAPET	INTEGER	CTABLE	REFS
7	KBPAGE	INTEGER	CLIST	REFS
4	KLABEL	INTEGER	CLIST	REFS
0	KLAST	INTEGER	F.P.	REFS
0	KOUNT	INTEGER	COMPUT	REFS
0	KOUNT	INTEGER	CLIST	REFS
1	KPAGE	INTEGER	CLIST	REFS
57	KROUP	INTEGER	CTABLE	REFS
0	KTABLE	INTEGER	CTABLE	REFS
5	KTABLO	INTEGER	CLIST	REFS
5	KTPAGE	INTEGER	CLIST	REFS
2	LINES	INTEGER	CLIST	REFS
10	LINESG	INTEGER	CLIST	REFS
3	LINEST	INTEGER	CLIST	REFS
60	MAXV	INTEGER	REFS	REFS
61	N	INTEGER	REFS	REFS
0	NCHAR	INTEGER	F.P.	REFS
55	NCHAR1	INTEGER	REFS	REFS
1	NCHARW	INTEGER	COMPUT	REFS
3	NCOLS	INTEGER	CTABLE	REFS
4	NCOLST	INTEGER	CTABLE	REFS
6	NPAGE	INTEGER	CLIST	REFS
6	NPAGEA	INTEGER	CTABLE	REFS
1	NPASS	INTEGER	CTABLE	REFS
2	NROWS	INTEGER	CTABLE	REFS
56	NWORDS	INTEGER	REFS	REFS
	VARIABLES USED AS FILE NAMES, SEE ABOVE			

## STATEMENT LABELS DEF LINE REFERENCES

	DEF	LINE	REFERENCES
0	100	INACTIVE	19
35	300		40 16 17

## COMMON BLOCKS LENGTH , MEMBERS - BIAS NAME(LENGTH)

CLIST	9	O KOUNT (1)	1 KPAGE (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)	5 KBPAGE (1)
		6 NPAGE (1)	7 KTABLE (1)	8 LINESG (1)
CTABLE	8	0 KTABLE (1)	1 NPASS (1)	2 NROWS (1)
		3 NCOLS (1)	4 NCOLST (1)	5 KTABLO (1)
COMPUT	2	6 NPAGEA (1)	7 ITAPET (1)	1 NCHARW (1)
		0 KOMPUT (1)		

STATISTICS  
 PROGRAM LENGTH 65B  
 CM LABELED COMMON LENGTH 23B  
 52000B CM USED 19

```

1      C *****
2      C ***** SUBROUTINE PLABEL *****
3      C ***** COMPUTER VERSION *****
4      C ***** IBM COMPUTER PROGRAM VERSION *****
5      C ***** FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED
6      C BY CIBM IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE IBM
7      C COMPUTER AND SHOULD BE LEFT BLANK.
8      C ***** CDC COMPUTER PROGRAM VERSION *****
9      C ***** FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED
10     C BY CIBM IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE IBM
11     C COMPUTER AND SHOULD HAVE A C IN COLUMN ONE.
12     C ***** SUBROUTINE PLABEL (PNAME,CNAME,NTAPE,NAME,NFILE,IROWS,JCOLS,TSIO)
13     C ***** BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
14     C ***** DOUBLE PRECISION PNAME ,CNAME ,UNITNA
15     C ***** ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
16     C ***** DIMENSION NAME(2)
17     C COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE ,NPAGE
18     C 1 COMMON /LABELS/ .KBPAGE ,LINESG ,KOUNTN ,KOUNTI
19     C COMMON /COMRWP/ ITAPER ,ITAPEW ,ITAPEP
20     C ***** PLABEL
21     C ***** INITIAL CONDITIONS
22     C DATA FSIO /4HF$IO/
23     C DATA DSIO /4HD$IO/
24     C DATA UNITNA /8H /
25     C ***** LIST LABELS IN THE CURRENT CALCULATION
26     C IF (KLABEL .EQ. 1) GO TO 50
27     C LEFT=LINES-KOUNT
28     C IF (LEFT LT 3) KOUNT=LINES
29     C CALL TITLES(2)
30     C KOUNT=KOUNT+3
31     C WRITE (ITAPEW,1000) CNAME ,PNAME ,NAME ,NTAPE ,NFILE ,IROWS ,JCOLS
32     C 50 CONTINUE
33     C ***** PREPARE TABLE FOR INPUT-OUTPUT LABELS
34     C IF (K1AIFI .EQ. 1) GO TO 40
35     C ***** PLABEL
36     C ***** PLABEL
37     C ***** PLABEL
38     C ***** PLABEL
39     C ***** PLABEL
40     C ***** PLABEL
41     C ***** PLABEL
42     C ***** PLABEL
43     C ***** PLABEL
44     C ***** PLABEL
45     C ***** PLABEL
46     C ***** PLABEL
47     C ***** PLABEL
48     C ***** PLABEL
49     C ***** PLABEL
50     C ***** PLABEL
51     C ***** PLABEL
52     C ***** PLABEL
53     C ***** PLABEL
54     C ***** PLABEL
55     C ***** PLABEL
56     C ***** PLABEL
57     C ***** PLABEL
58     C ***** PLABEL

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SUBROUTINE PLABEL 74/74 OPT=1

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      IF (TSIO .EQ. FSIO) AND KFLABO .EQ. 2) GO TO 100      PLABEL 59
      IF (TSIO .EQ. DSIO) AND KDLABO .EQ. 2) GO TO 110      PLABEL 60
      GO TO 300                                              PLABEL 61
100  CONTINUE                                              PLABEL 62
      KFLABI = 2                                            PLABEL 63
      GO TO 120                                              PLABEL 64
110  CONTINUE                                              PLABEL 65
      KOLABI = 2                                            PLABEL 66
120  CONTINUE                                              PLABEL 67
      KROUP = 2                                             PLABEL 68
      MAXV = 9                                              PLABEL 69
      WRITE (ITAPEL) MAXV,KROUP,NTAPE,NAME,NFILE,IROWS,JCOLS,NPAGE,TSIO
1     ,PNAME,CNAME,UNITNA                                 PLABEL 70
      C
      300  CONTINUE                                         PLABEL 71
      400  CONTINUE                                         PLABEL 72
      C
      C FORMATS
      1000 FORMAT (1X./,10X,5HFROM ,1A6, 1X, 10HCALLED BY , 1A8
      1     ,/,10X,3X,7HNAME = ,2A4, 1H,,2X
      2     ,7HUNIT = ,12,1H,,2X
      3     ,7HFILE = ,12,1H,,2X
      4     ,7ROWS = ,15,1H,,2X
      5     ,7COLUMNS = ,15)
      C
      RETURN
      END
85

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 PLABEL	23	84

VARIABLES	SN	TYPE	RELOCATION F.P.	REFS	DEFINED
0 CNAME		REAL		51	69
46 DSIO		REAL		59	DEFINED 40
45 FSIO		REAL		58	DEFINED 39
0 IROWS		INTEGER	F.P.	51	69
4 ITAPEL		INTEGER	LABELS	33	I/O REFS 69
2 ITAPEP		INTEGER	COMRWP	34	
0 ITAPER		INTEGER	COMRWP	34	
1 ITAPEW		INTEGER	COMRWP	34	I/O REFS 51
0 JCOLS		INTEGER	F.P.	51	69
7 KBPAGE		INTEGER	CLIST	31	
3 KDLABI		INTEGER	LABELS	33	DEFINED 65
1 KDLABO		INTEGER	LABELS	33	DEFINED 59
2 KFLABI		INTEGER	LABELS	33	DEFINED 62
0 KFLABO		INTEGER	LABELS	33	
5 KLAEI		INTEGER	LABELS	33	
4 KLABEL		INTEGER	CLIST	31	
0 KOUNT		INTEGER	CLIST	31	47
11 KOUNTH		INTEGER	CLIST	31	50
			REFS		DEFINED 48

SUBROUTINE PLABEL

VARIABLES SN TYPE

12 KOUNT1	INTEGER	RELOCATION	31
1 KPAGE	INTEGER	CLIST	REFS 31
120 KROUP	INTEGER	CLIST	REFS 69
5 KTPAGE	INTEGER	CLIST	REFS 31
117 LEFT	INTEGER	CLIST	REFS 48
2 LINES	INTEGER	CLIST	REFS 31
10 LINESG	INTEGER	CLIST	REFS 31
3 LINEST	INTEGER	CLIST	REFS 31
121 MAXV	INTEGER	CLIST	REFS 69
O NAME	INTEGER	F P	REFS 29
O NFILE	INTEGER	F P	REFS 51
6 NPAGE	INTEGER	CLIST	REFS 31
O NTAPE	INTEGER	F P	REFS 51
O PNAME	REAL	F P	REFS 51
O TSIC	REAL	F P	REFS 58
47 UNITNA	REAL		REFS 69

VARIABLES USED AS FILE NAMES. SEE ABOVE

EXTERNALS TITLES TYPE ARG'S REFERENCES

STATEMENT LABELS DEF LINE REFERENCES

20 50	52	46
33 100	61	58
35 110	64	59
36 120	66	63
42 300	72	60
42 400	73	57
100 1000	77	51

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

CLIST	11	0 KOUNT (1)	1 KPAGE (1)
		3 LINEST (1)	4 KLABEL (1)
		6 NPAGE (1)	7 KBPAGE (1)
		9 KOUNTI (1)	10 KOUNTI (1)
LABELS	6	0 KFLABO (1)	1 KDLABO (1)
COMRWP	3	3 KOLABI (1)	4 ITAPEL (1)
		0 ITAPER (1)	1 ITAPEW (1)

STATISTICS  
PROGRAM LENGTH  
CM LABELED COMMON LENGTH  
520000B CM USED

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RELOCATION	CLIST	CLIST	CLIST
REFS	REFS	REFS	REFS
DEFINED	67	47	48
REFS	31	47	48
REFS	31	31	31
REFS	69	69	69
REFS	29	51	69
REFS	51	69	DEFINED
REFS	31	69	23
REFS	51	69	DEFINED
REFS	51	69	23
REFS	58	59	DEFINED
REFS	69	69	DEFINED
REFS	41	41	23

2 LINES (1)  
5 KTPAGE (1)  
8 LINESG (1)  
2 KFLABI (1)  
5 KLABEL (1)  
2 ITAPEL (1)  
2 ITAPEW (1)

SUBROUTINE MESSAGE

FTN 4.8+577

2

ENTRY POINTS DEF LINE REFERENCES  
3 MESSAGE 4 49

VARIABLES	SN	TYPE	RELOCATION	REFS
2 ITAPER	INTEGER	COMRWP	REFS	10
0 ITAPER	INTEGER	COMRWP	REFS	10
1 ITAPEW	INTEGER	COMRWP	REFS	10
7 KBPAGE	INTEGER	CLIST	REFS	11
4 KLABEL	INTEGER	CLIST	REFS	11
0 KMESAG	INTEGER	MESAG	REFS	13
0 KOMPUT	INTEGER	COMPUT	REFS	15
0 KOUNT	INTEGER	CLIST	REFS	11
11 KOUNTH	INTEGER	CLIST	REFS	11
12 KOUNTI	INTEGER	CLIST	REFS	11
1 KPAGE	INTEGER	MESAG	REFS	11
1 KTIME	INTEGER	MESAG	REFS	13
1 KTITLE	INTEGER	CLIST	REFS	11
5 KIPAGE	INTEGER	F.P.	REFS	19
0 KTYPE	INTEGER	INTEGR	REFS	27
132 L	INTEGER	LEFT	REFS	28
131 LEFT	INTEGER	CLIST	REFS	24
2 LINES	INTEGER	CLIST	REFS	11
10 LINESG	INTEGER	CLIST	REFS	11
3 LINEST	INTEGER	CLIST	REFS	11
0 NCHAR	INTEGER	F.P.	REFS	20
1 NCHARW	INTEGER	COMPUT	REFS	15
127 NCHAR <sup>1</sup>	INTEGER	CLIST	REFS	21
126 NDIV	INTEGER	CLIST	REFS	22
0 NO	INTEGER	CONSTS	REFS	14
6 NPAGE	INTEGER	CLIST	REFS	11
130 NWORDS	INTEGER	ARRAY	F.P.	27
0 TEXT	REAL	CONSTS	REFS	8
1 YES	INTEGER	CONSTS	REFS	6
VARIABLES USED AS FILE NAMES, SEE ABOVE				
EXTERNALS	TYPE	ARGS	REFERENCES	
PLB	3	26	25	33
TITLES	1			

STATEMENT LABELS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
62 500	3	0 ITAPER (1)
64 600	11	0 KOUNT (1)
107 1000	FMT	3 LINEST (1)
114 2000	FMT	4 KLABEL (1)
121 3000	FMT	6 NPAGE (1)
		7 KBPAGE (1)
		9 KOUNTH (1)
		10 KOUNTI (1)
		1 KTITLE (1)
		1 YES (1)
		1 NCHARW (1)

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	DEF LINE REFERENCES	DEF LINE REFERENCES
COMRWP	3	0 ITAPER (1)	32	1 ITAPER (1)
CLIST	11	0 KOUNT (1)	34	1 KPAGE (1)
		3 LINEST (1)	43	4 KLABEL (1)
		6 NPAGE (1)	27	7 KBPAGE (1)
		9 KOUNTH (1)	28	8 LINESG (1)
		10 KOUNTI (1)		
		1 KTITLE (1)		
		1 YES (1)		
		1 NCHARW (1)		

SUBROUTINE MESSAGE

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PAGE

2

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SUBROUTINE MESSAGE      74/74    OPT+1          FIN 4.8+577    85/01/23   08.10.44    PAGE   1

1      C45700, SUB MESSAGE (ENTER AND LEAVE MESSAGES FROM CALLING PROGRAMS)
C
C      SUBROUTINE MESSAGE (KTYPE,NCHAR,TEXT)

5      C      INTEGER YES
C
C      DIMENSION TEXT(1)

C      COMMON /COMRWP/ ITAPER,ITAPEW,ITAREP
C      COMMON /CLIST/ KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE
C      COMMON /MESAG/ KMESAG,KTITLE,KOUNTI
C      COMMON /CONSTS/ NO,YES
C      COMMON /COMPUT/ KOMPUT,NCHARW

10     C      IF (KMESAG .EQ. NO) GO TO 500
        NDIV = 60
        IF (KTYPE .EQ. 3) NDIV = 72
        NCHAR1 = NCHAR - 1
        NWORDS = NCHAR1/NCHARW + 1
        KOUNT1 = NCHAR1/NDIV + 3
        LEFT=LINES-KOUNT
        IF (LEFT.LT.KOUNT1) KOUNT=LINES
        CALL TITLES(2)
        CALL PLB (1,2,ITAPER)
        IF (KTYPE .EQ. 1) WRITE (ITAPEW,1000) (TEXT(L), L=1,NWORDS)
        IF (KTYPE .EQ. 2) WRITE (ITAPEW,2000) (TEXT(L), L=1,NWORDS)
        IF (KTYPE .EQ. 3) WRITE (ITAPEW,3000) (TEXT(L), L=1,NWORDS)
        KOUNT=KOUNT+KOUNT1
        GO TO 600
500    CONTINUE
        CALL TITLES(2)
600    CONTINUE

35     C      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
        C1000 FORMAT (10X, 12HENTER PROG. ,15A4 / (22X, 15A4))
        C2000 FORMAT (10X, 12HLEAVE PROG. ,15A4 / (22X, 15A4))
        C3000 FORMAT (10X, 18A4)
        CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
        CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
        1000 FORMAT (10X, 12HENTER PROG. ,6A10 / (22X, 6A10))
        2000 FORMAT (10X, 12HLEAVE PROG. ,6A10 / (22X, 6A10))
        3000 FORMAT (10X, 7A10,1A2)
        CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
        C
        C      RETURN
        END

50

```

PAGE 2

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FTN 4.8+577

SUBROUTINE FCLOSE 74/74 OPT=1

ENTRY POINTS DEF LINE REFERENCES  
3 FCLOSE 3 40

VARIABLES SN TYPE RELOCATION REFERENCES  
1 IFILES INTEGER ARRAY CFILES REFS 6 7 DEFINED 19 35  
0 KFILES INTEGER CFILES REFS 7  
0 KGEN INTEGER F.P. REFS 10 DEFINED 3  
0 NFILE INTEGER F.P. REFS 19 DEFINED 3  
0 NTAPE INTEGER F.P. REFS 19 DEFINED 3  
VARIABLES USED AS FILE NAMES. SEE ABOVE 16

STATEMENT LABELS DEF LINE REFERENCES  
14 200 15 10  
22 300 27 10  
24 400 38 22

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)  
CFILES 2 0 KFILES (1)

STATISTICS  
PROGRAM LENGTH 26B 22  
CM LABELED COMMON LENGTH 2B 2  
5200OB CM USED

```

PAGE 1
SUBROUTINE FCLOSE   74/74    OPT=1          FTN 4.8+577    85/01/23. 08.10.44

1      C45700 SUB  FCLOSE (FORTRAN CLOSING (END OF FILE) OR REWINDING OF I/O)
C
C      SUBROUTINE FCLOSE (NTAPE.NFILE.KGEN)
C
5      CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
      DIMENSION IFILES(1)
      COMMON /CFILES/KFILES,IFILES
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C
      GO TO (200, 300), KGEN
C
C      CLOSE FILE AT THE END OF A WRITE
C
15     200 CONTINUE
      END FILE NTAPE
C
C      BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
      CCDC IFILES(NTAPE) = NFILE + 1
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C
      GO TO 400
C
C      CLOSE FILE AT THE END OF A READ
C
25     300 CONTINUE
C
C      BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      CIBM REWIND NTAPE
      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
C      BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
      CCDC IFILES(NTAPE) = NFILE
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C
      400 CONTINUE
C
      RETURN
END

```

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AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT  
DIAGNOSIS OF PROBLEM

SYMBOLIC REFERENCE MAP (D=3)

SUBROUTINE TSI0 74/74 OPT=1

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## SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	TS10	3	48
VARIABLES	SN	TYPE	RELOCATION
73	IFILE	* INTEGER	DEFINED
0	INCFIL	INTEGER	DEFINED
66	IO	INTEGER	REFS
67	IOS	INTEGER	REFS
0	KGEN	INTEGER	REFS
70	LASTF	INTEGER	REFS
0	LOCFIL	INTEGER	REFS
0	LTUF	INTEGER	REFS
0	LTUFD	INTEGER	REFS
72	NEXTF	INTEGER	REFS
71	NEXTIO	INTEGER	REFS
0	NFILE	INTEGER	REFS
0	NTAPE	INTEGER	REFS
0	NTUF	INTEGER	REFS
0	TSION	REAL	REFS
0	TSIONS	REAL	REFS
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE REFERENCES
MAXO	INTEGER	O INTRIN	34
STATEMENT LABELS		DEF LINE REFERENCES	
0	100	19	16
17	120	20	18
31	200	28	23
46	230	35	30
55	300	43	23
61	400	45	38
LOOPS	LABEL	INDEX	FROM-TO LENGTH PROPERTIES
11	100	10	16 19 68 INSTACK
40	230	10	30 35 78 INSTACK
STATISTICS	PROGRAM LENGTH	101B	65
	52000B CM USED		

```

1      C45700 SUB TSIO (SEARCH FOR TYPICAL SEQUENTIAL I/O UNITS AND FILES)      FTN 4.8+577
      C
      C      SUBROUTINE TSIO (TSION,NTAPE,NFILE,INCFL,LOCFL,KGEN
      1
      C
      5      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C      DOUBLE PRECISION TSIONS, TSION
      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C
      10     DIMENSION TSIONS(LTUF)
            DIMENSION NTUF(LTUFD,3)
      C
      C      INITIAL CONDITIONS
      C
      15     DO 100 IO=1,LTUF
            IOS = 10
            IF (TSION .EQ. TSIONS(IO)) GO TO 120
            100 CONTINUE
            120 CONTINUE
            NTAPE = NTUF(IOS,1)
      C
            GO TO (200, 300), KGEN
      C
      25     C DEFINE FILE NUMBER TO WRITE ON UNIT NTAPE
      C
            200 CONTINUE
            LASTF = 0
            DO 230 IO=1,LTUF
            NEXTIO = NTUF(IO,1)
            IF (NTAPE .NE. NEXTIO) GO TO 230
            NEXTF = NTUF(IO,2)
            LASTF = MAX0(LASTF,NEXTF)
            230 CONTINUE
            NFILE = LASTF + 1
            NTUF(IOS,2) = NFILE
            GO TO 400
      C
            C DEFINE FILE NUMBER TO READ FROM UNIT NTAPE
      C
            300 CONTINUE
            NFILE = NTUF(IOS,2)
            400 CONTINUE
            IFILE = NTUF(IOS,3)
      C
            RETURN
            END

```

```

SUBROUTINE DSIO      74/74    OPT=1          FTN 4.8+577      85/01/23. 08.10.44        PAGE 1

1      C45700 SUB. DSIO (SEARCH FOR DISK SEQUENTIAL I/O UNITS AND FILES)
C
C      SUBROUTINE DSIO (DSION,NTAPE,NFILE,INCFILE,LOCFILE,KGEN)
C
5      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      DOUBLE PRECISION DSION,DSION
CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
10     COMMON /DS101 / LDUF ,LDUFD ,NDUF
      COMMON /DS102 / DSIONS
C
C      SEARCH FOR FORTRAN (DSIO) UNIT AND FILE NUMBERS
C
15     CALL TSI0 (DSION,NTAPE,NFILE,INCFILE,LOCFILE,KGEN
1           ,DSIONS,NDUF,LDUF,LDUFD)
C
      C      RETURN
      END

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES			
3	3	18			
VARIABLES	SN	TYPE	RELOCATION	REFS	DEFINED
0	DSION	REAL	F.P.	DS102	REFS 10 15
0	DSIONS	REAL	F.P.	REFS 15	DEFINED 3
0	INCFILE	INTEGER	F.P.	REFS 15	DEFINED 3
0	KGEN	INTEGER	F.P.	REFS 15	DEFINED 3
0	LDUF	INTEGER	F.P.	DS101	REFS 9 15
1	LDUFD	INTEGER	F.P.	DS101	REFS 9 15
0	LOCFILE	INTEGER	F.P.	DS101	REFS 9 15
2	NDUF	INTEGER	F.P.	REFS 15	DEFINED 3
0	NFILE	INTEGER	F.P.	REFS 15	DEFINED 3
0	NTAPE	INTEGER	F.P.	REFS 15	DEFINED 3
EXTERNALS	TSIO	TYPE	ARGS	REFERENCES	
			10	15	
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)			
DS101	3	O LDUF (1)	1	LDUFD (1)	2 NDUF (1)
DS102	1	O DSIONS (1)			
STATISTICS					
PROGRAM LENGTH					
CM LABELED COMMON LENGTH					
520000B CM USED			33B 27		
			4B 4		

SUBROUTINE FSIO	74/74	OPT=1	FTN 4 . 8+577	85/01/23 . 08 . 10 . 44	PAGE 1
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```

1      C45700 SUB. FSIO ( SEARCH FOR FORTRAN SEQUENTIAL I/O UNITS AND FILES )
C
2      SUBROUTINE FSIO (FSION,NTAPE,NFILE,INCFIL,LOCFIL,KGEN)
C
3      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
4      CIBM DOUBLE PRECISION FSIONS,FSION
5      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
6      COMMON /FSIO1 / LFUF ,LFUFD ,NFUF
C
7      COMMON /FSIO2 / FSIONS
C
8      C SEARCH FOR FORTRAN (FSIO) UNIT AND FILE NUMBERS
C
9      CALL TSIO (FSION,NTAPE,NFILE,INCFIL,LOCFIL,KGEN
10
11     ,FSIONS,NFUF,LFUF,LFUFD)
C
12     RETURN
13     END
14
15
16
17
18
19
20

```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 FSIO	3	18
VARIABLES	SN TYPE	RELOCATION
O FSION	REAL	F.P.
O FSIONS	REAL	REFS FSIO2
O INCFIL	INTEGER	F.P.
O KGEN	INTEGER	F.P.
O LFUF	INTEGER	REFS FSIO1
1 LFUFD	INTEGER	F.P.
O LOCFIL	INTEGER	REFS FSIO1
O NFILE	INTEGER	F.P.
2 NFUF	INTEGER	REFS FSIO1
O NTAPE	INTEGER	F.P.
EXTERNALS	TYPE	REFS
TSIO		15
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
FSIO1	3	O LFUF (1)
FSIO2	1	O FSIONS (1)
STATISTICS	PROGRAM LENGTH	33B 27
CM LABELED COMMON LENGTH	4B 4	52000B CM USED

VARIABLES	SN	TYPE	RELOCATION		FTN 4.8+577	85/01/23. 08.10.44	PAGE
O NAME		INTEGER	ARRAY	F.P.	74	76	77
O NFILE		INTEGER	ARRAY	F.P.	REFS	58	73
10 NO2LAB		INTEGER	ARRAY	PUTGET	REFS	70	71
O NTAPE		INTEGER		F.P.	REFS	59	61
O PNAME		REAL		F.P.	REFS	71	83
				F.P.	REFS	88	88
EXTERNALS		TYPE	ARGS	REFERENCES			
DATE			1	81			
DFIND			2	71			
DWRITE			3	83			
PLABEL			8	88			
STATEMENT	LABELS		DEF LINE	REFERENCES			
O 9		INACTIVE	71	70			
14 10			73	2*70			
COMMON	BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)				
		PUTGET	10	O LABEL (8)			
				8 NO2LAB (2)			
STATISTICS							
PROGRAM LENGTH							
CM LABELED COMMON LENGTH							
52000B CM USED							

SUBROUTINE PUDLAB      74/74      OPT = 1

FTN 4.8+577

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```

DIMENSION NAME(1)
DIMENSION NO2LAB(2)
C
C COMMON /PUTGET/ LABEL, NO2LAB
C
C PUT LABEL INFORMATION ON INPUT UNIT
C
DATA IBIN/3HBIN/
DATA IBLANK /1H /
LABEL(7) = IBLANK
C
IF (NFILE) 10, 10, 9
9 CALL DFIND (NTAPE,NFILE)
C
SET NAME
10 LABEL(1)=NAME(1)
LABEL(2)=NAME(2)
C
SET ROW+COL COUNTS
LABEL(3)=IROWS
LABEL(4)=JCOLS
C
DENOTE BINARY TAPE
LABEL(5)=IBIN
C
SET DATE
CALL DATE(LABEL(6))
LABEL(8)=O
CALL DWRITE (NTAPE,LABEL(1),32)
C
C PREPARE LABEL INFORMATION FOR LISTING
C
CALL PLABEL (PNAME,6HPLDLAB,NTAPE,NAME,NFILE,IROWS,JCOLS,4HDSIO)
C
RETURN
END

```

CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM
74	I	NAME	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

## SYMBOLIC REFERENCE MAP (B=3)

ENTRY POINTS	DEF LINE	REFERENCES				
VARIABLES	SN	TYPE	RELOCATION	REFS	DEFINITION	66
3 PUDLAB	51	90				
66 IBIN		INTEGER		REFS	68	DEFINED
67 IBLANK		INTEGER		REFS	76	DEFINED
0 IROWS		INTEGER	F.P.	REFS	88	DEFINED
0 JCOLS		INTEGER	F.P.	REFS	77	DEFINED
0 LAREF		INTEGER	ARRAY	REFS	57	DEFINED
0 LAREF		INTEGER	STRUCTURE	REFS	64	DEFINED



SUBROUTINE GEDLAB 74/74 OPT=1 FTN 4.8+577 85/01/23 08 10.44 PAGE 3

EXTERNALS PLABEL TYPE ARGS REFERENCES  
0 9 8 80

STATEMENT LABELS INACTIVE DEF LINE REFERENCES  
0 9 69 68  
13 10 70 2\*68

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)  
PUTGET 10 O LABEL (8) 8 NO2LAB (2)

STATISTICS

PROGRAM LENGTH  
CM LABELED COMMON LENGTH  
52000B CM USED

76B 62  
12B 10

74/74 OPR=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 2

```

C      DIMENSION LABEL(8)          GEDLAB 59
      DIMENSION NAME(1)           GEDLAB 60
      DIMENSION NO2LAB(2)         GEDLAB 61
C      COMMON /PUTGET/ LABEL, NO2LAB GEDLAB 62
C      GET LABEL INFORMATION FROM OUTPUT UNIT GEDLAB 63
C      IF (NFILE) 10, 10, 9          GEDLAB 64
      9 CALL DFIND (NTAPE,NFILE)     GEDLAB 65
      10 CALL DREAD (NTAPE,LABEL(1),32) GEDLAB 66
      NAME(1)= LABEL(1)             GEDLAB 67
      NAME(2)= LABEL(2)             GEDLAB 68
      IROWS = LABEL(3)              GEDLAB 69
      JCOLS = LABEL(4)              GEDLAB 70
      IF (LABEL(8).EQ.2) CALL DREAD (NTAPE,NO2LAB(1),8) GEDLAB 71
C      PREPARE LABEL INFORMATION FOR LISTING GEDLAB 72
C      CALL PLABEL (PNAME,6HGEDLAB,NTAPE,NAME,NFILE,IROWS,JCOLS,4HDSIO) GEDLAB 73
C      RETURN END                   GEDLAB 74
C      GEDLAB 75
C      GEDLAB 76
C      GEDLAB 77
C      GEDLAB 78
C      GEDLAB 79
C      GEDLAB 80
C      GEDLAB 81
C      GEDLAB 82
C      GEDLAB 83
C      GEDLAB 84

```

CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM
72	1	NAME	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 GEDLAB	53	82

VARIABLES	SN	TYPE	RELOCATION	REFS	DEFINED	53	73
O IROWS		INTEGER	F.P.	REFS	80	DEFINED	53
O JCOLS		INTEGER	F.P.	REFS	80	DEFINED	53
O LABEL		INTEGER	ARRAY	PUTGET	59	63	74
O NAME		INTEGER	ARRAY	F.P.	REFS	75	70
O NFILE		INTEGER	F.P.	REFS	60	80	DEFINED
10 NO2LAB		INTEGER	ARRAY	PUTGET	68	69	53
O NTAPE		INTEGER	F.P.	REFS	61	63	71
O PNAME		REAL	F.P.	REFS	69	70	72
EXTERNALS		TYPE	ARGS	REFERENCES	80	DEFINED	53
DFIND	2			69	80	DEFINED	53
DREAD	3			70	75		53

74/74 OPT = 1

FTN 4.8+577

- 7 -

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1      C45700, SUB GEDLAB (GET DSIO LABEL FROM TAPE)
C      C***** GEDLAB ***** GEDLAB 3
C      C***** GEDLAB ***** GEDLAB 4
C      C***** GEDLAB ***** GEDLAB 5
C      C*** SUBROUTINE GEDLAB **** GEDLAB 6
C      C*** COMPUTER VERSION **** GEDLAB 7
C      C***** GEDLAB ***** GEDLAB 8
C      C***** GEDLAB ***** GEDLAB 9
C      C IBM COMPUTER PROGRAM VERSION GEDLAB 10
C      C***** GEDLAB ***** GEDLAB 11
C      C FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED
C      C BY CIBM IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE IBM
C      C COMPUTER AND SHOULD BE LEFT BLANK. GEDLAB 12
C      C***** GEDLAB ***** GEDLAB 13
C      C CDC COMPUTER PROGRAM VERSION GEDLAB 14
C      C***** GEDLAB ***** GEDLAB 15
C      C***** GEDLAB ***** GEDLAB 16
C      C***** GEDLAB ***** GEDLAB 17
C      C***** GEDLAB ***** GEDLAB 18
C      C***** GEDLAB ***** GEDLAB 19
C      C***** GEDLAB ***** GEDLAB 20
C      C***** GEDLAB ***** GEDLAB 21
C      C***** GEDLAB ***** GEDLAB 22
C      C***** GEDLAB ***** GEDLAB 23
C      C***** GEDLAB ***** GEDLAB 24
C      C***** GEDLAB ***** GEDLAB 25
C      C***** GEDLAB ***** GEDLAB 26
C      C***** GEDLAB ***** GEDLAB 27
C      C***** GEDLAB ***** GEDLAB 28
C      C***** GEDLAB ***** GEDLAB 29
C      C***** GEDLAB ***** GEDLAB 30
C      C***** GEDLAB ***** GEDLAB 31
C      C***** GEDLAB ***** GEDLAB 32
C      C***** GEDLAB ***** GEDLAB 33
C      C***** GEDLAB ***** GEDLAB 34
C      C***** GEDLAB ***** GEDLAB 35
C      C***** GEDLAB ***** GEDLAB 36
C      C***** GEDLAB ***** GEDLAB 37
C      C***** GEDLAB ***** GEDLAB 38
C      C***** GEDLAB ***** GEDLAB 39
C      C***** GEDLAB ***** GEDLAB 40
C      C***** GEDLAB ***** GEDLAB 41
C      C***** GEDLAB ***** GEDLAB 42
C      C***** GEDLAB ***** GEDLAB 43
C      C***** GEDLAB ***** GEDLAB 44
C      C***** GEDLAB ***** GEDLAB 45
C      C***** GEDLAB ***** GEDLAB 46
C      C***** GEDLAB ***** GEDLAB 47
C      C***** GEDLAB ***** GEDLAB 48
C      C***** GEDLAB ***** GEDLAB 49
C      C***** GEDLAB ***** GEDLAB 50
C      C***** GEDLAB ***** GEDLAB 51
C      C***** GEDLAB ***** GEDLAB 52
C      C***** GEDLAB ***** GEDLAB 53
C      C***** GEDLAB ***** GEDLAB 54
C      C***** GEDLAB ***** GEDLAB 55
C      C***** GEDLAB ***** GEDLAB 56

2      C      SUBROUTINE GEDLAB (PNAME,NTAPE,NAME,NFILE,IROWS,JCOLS)
C      C***** BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      C IBM DOUBLE PRECISION PNAME

```

SUBROUTINE MESSAGE      74/74      OPT=1  
STATISTICS  
PROGRAM LENGTH      133B      91  
CM LABELED COMMON LENGTH      25B      21  
5200OB CM USED

SUBROUTINE MESSAGE      74/74      OPT=1  
FTN 4.8+577      85/01/23. OB .10.44  
PAGE 3

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SUBROUTINE TIMEB      74/74    OPT=1          FTN 4.8+577      85/01/23. 08.10.44      PAGE   1

1      C45700. SUB. TIMEB(COMPUTER TIME VERSION B)
C
C      SUBROUTINE TIMEB (NCHAR,TEXT)

5      C      DIMENSION CHAR(1)
DIMENSION TEXT(1)

C      COMMON /MESAG / KMESAG,KTITLE,KTIME ,KTIMEL

10     C      IF (KTIMEL .EQ. 1) GO TO 100
CALL TIMEA (KTITLE,KTIME ,1,TDUMMY,NCHAR,TEXT)
100    CONTINUE

C      RETURN
END

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 TIMEB	4	15
VARIABLES	SN	TYPE
25 CHAR	REAL	*UNDEF
0 KMESAG	INTEGER	MESAG
2 KTIME	INTEGER	MESAG
3 KTIMEL	INTEGER	MESAG
1 KTITLE	INTEGER	MESAG
0 NCHAR	INTEGER	F.P.
24 TDUMMY	* REAL	ARRAY
0 TEXT	REAL	F.P.
EXTERNALS	TYPE	ARGS
TIMEA		REFERENCES 6 12
STATEMENT LABELS		DEF LINE REFERENCES
13 100		13 11
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
MESAG	4	0 KMESAG (1) 3 KTIMEL (1)
STATISTICS		1 KTITLE (1)
PROGRAM LENGTH		2 KTIME (1)
CM LABELED COMMON LENGTH		
520000B CM USED		

TIMEB	2
TIMEB	3
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TIMEB	14
TIMEB	15
TIMEB	16
TIMEB	17

SUBROUTINE PROGNA 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 1  
 1 C C45700, SUB. PROGNA (PROGRAM NAME CONSISTING OF TWO WORDS - VERSION B)  
 C SUBROUTINE PROGNA (WORD1,WORD2)  
 5 C DIMENSION TSH(1)  
 C COMMON /CTSH/ KTSW, LTSW, TSW  
 C L1 = LTSW - 1  
 C L2 = LTSW  
 10 C TSW(L1)= WORD1  
 C TSW(L2)= WORD2  
 C RETURN  
 15 C END

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3	4	15
VARIABLES	SN	TYPE
0	KTSW	INTEGER
1	LTSW	INTEGER
14	L1	INTEGER
15	L2	INTEGER
2	TSW	REAL
0	WORD1	REAL
0	WORD2	REAL
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CTSH	3	0 KTSW (1)
STATISTICS		1 LTSW (1)
PROGRAM LENGTH		2 TSW (1)
CM LABELED COMMON LENGTH	16B 3B	14 3
52000B CM USED		

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1      C   SUBROUTINE PRMAT1(IUNIT,IFILE,WORK,LOWTRI,IUOUT,LWIDE,NCHAR,A)
2      C
3      C THIS ROUTINE WRITES OUT ALL THE ELEMENTS (INCLUDING ZEROES) OF A
4      C MATRIX STORED (IN ROW SORT) ON AN I/O UNIT.
5      C
6      C IUNIT - UNIT ON WHICH MATRIX RESIDES
7      C IFILE - FILE ON WHICH MATRIX RESIDES
8      C WORK - STORAGE LOCATION IN CORE LARGE ENOUGH TO CONTAIN A ROW
9      C          OF THE MATRIX
10     C
11     C LOWTRI=0 WRITE OUT ENTIRE MATRIX
12     C =1 WRITE OUT LOWER TRIANGLE (OF SQUARE MATRIX)
13     C
14     C IUOUT - UNIT TO BE WRITTEN ON
15     C LWIDE - NUMBER OF MATRIX ELEMENTS (NOT TO EXCEED 7) PER ROW OF
16     C          OUTPUT
17     C NCHAR - NUMBER OF CHARACTERS IN DESCRIPTIVE COMMENT
18     C          A - DESCRIPTIVE COMMENT
19     C
20     C
21     C DIMENSION WORK(1),NAME(2),MES(4,2)
22     C
23     C COMMON /CLIST / KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE
24     C           1,KBPAGE,LINESG,KOUNTH,KOUNTI
25     C           COMMON /COMPUT/ KOMPUT,NCHARW
26     C
27     C DATA MES/4HFULL,4HMAT,4HRIX ,4H
28     C           4HLOWE,4HR TR,4HJIANG,4HLE /
29     C           DATA HEAD/4HV,4HALUE/
30     C
31     C
32     C NWIDE=LWIDE
33     C IF(NWIDE.GT.7) NWIDE=7
34     C
35     C CALL GEDLAB(GHPRMAT1,IUNIT,NAME,IFILE,KROW,KCOL)
36     C           KLUTRI=LOWTRI
37     C           IF(KROW.NE.KCOL) KLUTRI=0
38     C           MTRI=KLUTRI+1
39     C           JMAX=KCOL
40     C
41     C NWORDS=(NCHAR-1)/NCHARW + 1
42     C NLINE$=(NCHAR-1)/120 + 1
43     C
44     C DO 100 I=1,KROW
45     C           IR=I
46     C           IF(KLUTRI.EQ.1) JMAX=IR
47     C           CALL GETROW(IUNIT,1,WORK,KCOL)
48     C           JEND=0
49     C
50     C           20 CONTINUE
51     C           .IBEG=.JFN0+1
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1688   C
1689   C
1690
```

SUBROUTINE PRMAT1 74/74 OPT=1

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```

JEND=JBEG+NWIDE-1
IF(JEND.GT.JMAX) JEND=JMAX

60      C   CALL TITLES(2)
        IF(KOUNT.GT.KOUNTH) GO TO 30
        WRITE(IUDOUT,900) NAME,KROW,KCOL,(MES(L,MTRI),L=1,4)
        KOUNT=KOUNT+2
        IF(NCHAR.LE.0) GO TO 25
        WRITE(IUDOUT,902) (A(L),L=1,NWORDS)
        KOUNT=KOUNT+NLINE$S
25    CONTINUE
        WRITE(IUDOUT,903) (HEAD,L=1,NWIDE)
        KOUNT=KOUNT+3

70      C   30 CONTINUE
        WRITE(IUDOUT,901) IR,JBEG,(WORK(J),J*JBEG,JEND)
        KOUNT=KOUNT+1

75      C   IF(JEND.LT.JMAX) GO TO 20
        C   IF(KOUNT.LT.JMAX) GO TO 20
        C   LREST=LINES-KOUNT
        IF(LREST.LT.2) GO TO 40
        CALL PLB(1,2,IUOUT)
        KOUNT=KOUNT+2
        GO TO 100
40    COUNT=LINES
        C   CALL DCLOSE(IUNIT)
        C   100 CONTINUE
        C   CALL DCLOSE(IUNIT)

80      C   900 FORMAT(/,10X,13HMATRIX NAME=,2A4,2X,1H(,14,3H X ,14,1H),2X,
        1       6HPRINT '4A4')
        901 FORMAT(10X,2I5,7(1PE15.6))
        CIBM
        C902 FORMAT(10X,3O4)
        CIBM
        CCDC
        902 FORMAT(10X, 12A10)
        CCDC
        903 FORMAT(/,10X, 10H ROW COL,7(7X,2A4),/)
        C   RETURN
        END

90      90
95      95
100     100

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES			
3 PRMAT1	2	100			
O A	REAL	ARRAY F.P.	REFS	25	66 DEFINED

VARIABLES	SN	TYPE	RELOCATION	74/74	OPT=1
251	I	INTEGER			
0	FILE	INTEGER	F.P.	DEFINED REFS REFS	50 2 51
252	I	INTEGER	F.P.	DEFINED REFS REFS	52 2 51
0	UNIT	INTEGER	F.P.	DEFINED REFS REFS	53 2 52
0	IOUT	INTEGER	F.P.	DEFINED REFS REFS	80 2 53
256	J	INTEGER		73	1/O REFS
254	JBEG	INTEGER		REFS REFS REFS	59 2 54
253	JEND	INTEGER		57 59	58
246	JMAX	INTEGER	CLIST	2*59	76
7	KPAGE	INTEGER	CLIST	REFS REFS REFS	27 39 57
243	KCOL	INTEGER	CLIST	REFS REFS REFS	39 27 52
4	KLABEL	INTEGER	CLIST	REFS REFS REFS	42 42 40
244	KLUTRI	INTEGER	COMPUT	REFS REFS REFS	29 27 48
0	KOMPUT	INTEGER	CLIST	REFS REFS REFS	62 64 67
0	KOUNT	INTEGER		81 83	74 67 70
11	KOUNTH	INTEGER	CLIST	REFS REFS REFS	27 27 27
12	KOUNT1	INTEGER	CLIST	REFS REFS REFS	27 39 27
1	KPAGE	INTEGER	CLIST	REFS REFS REFS	39 27 41
242	KROW	INTEGER	CLIST	REFS REFS REFS	27 39 50
5	KTPAGE	INTEGER	CLIST	REFS REFS REFS	66 66 63
255	L	INTEGER	CLIST	REFS REFS REFS	63 27 48
2	LINES	INTEGER	CLIST	REFS REFS REFS	27 27 27
10	LINESG	INTEGER	CLIST	REFS REFS REFS	78 78 83
3	LINEST	INTEGER	CLIST	REFS REFS REFS	78 78 83
0	LOWTRI	INTEGER	F.P.	REFS REFS REFS	40 40 40
257	LREST	INTEGER	CLIST	REFS REFS REFS	79 79 79
0	LWIDE	INTEGER	F.P.	REFS REFS REFS	36 36 36
262	MES	INTEGER	ARRAY	REFS REFS REFS	23 63 23
245	MTRI	INTEGER	ARRAY	REFS REFS REFS	63 23 45
260	NAME	INTEGER	F.P.	REFS REFS REFS	39 46 45
0	NCHAR	INTEGER	COMPUT	REFS REFS REFS	45 45 45
1	NCHARW	INTEGER		REFS REFS REFS	67 67 67
250	NLINES	INTEGER	CLIST	REFS REFS REFS	27 37 37
6	NPAGE	INTEGER		58 66 53	31
241	NWIDE	INTEGER		66 53 53	31
247	NWORDS	INTEGER		53 53 53	31
0	WORK	REAL	ARRAY	F.P. REFS REFS	46 45 46
VARIABLES USED AS FILE NAMES, SEE ABOVE					
EXTERNALS		TYPE	ARGS	REFERENCES	
			1	87 39 53 80 61	
STATEMENT LABELS			DEF LINE	REFERENCES	
46	20		56	76	
100	25		68	65	
112	30		72	62	
134	40		83	79	
136	10C		85	50	
217	900	FMT	89	82 63	

SUBROUTINE PRMAT1				FTN 4.8+577	85/01/23	08 . 10 . 44	PAGE	3
251	I	INTEGER		REFS REFS REFS	39 52 39	50 2 51		
0	FILE	INTEGER	F.P.	REFS REFS REFS	52 53 53	51 2 52		
252	I	INTEGER	F.P.	REFS REFS REFS	39 52 80	51 2 63	66	69
0	UNIT	INTEGER	F.P.	REFS REFS REFS	73 73 73	51 2 63		
0	IOUT	INTEGER	F.P.	REFS REFS REFS	73 73 73	51 2 63		
256	J	INTEGER		REFS REFS REFS	2*59 58 57	57 57 54	54	58
254	JBEG	INTEGER		REFS REFS REFS	57 59 59	57 57 54		
253	JEND	INTEGER		REFS REFS REFS	57 59 59	57 57 54		
246	JMAX	INTEGER	CLIST	REFS REFS REFS	2*59 27 39	57 52 53	52	58
7	KPAGE	INTEGER	CLIST	REFS REFS REFS	27 39 57	53 53 53	53	63
243	KCOL	INTEGER	CLIST	REFS REFS REFS	27 39 57	52 52 52	41	41
4	KLABEL	INTEGER	CLIST	REFS REFS REFS	42 42 42	40 40 40	41	41
244	KLUTRI	INTEGER	COMPUT	REFS REFS REFS	29 27 27	62 64 67	70	74
0	KOMPAT	INTEGER	CLIST	REFS REFS REFS	81 83 83	67 67 67	70	74
0	KOUNT	INTEGER		REFS REFS REFS	83 83 83	67 67 67	70	74
11	KOUNTH	INTEGER	CLIST	REFS REFS REFS	27 27 27	62 62 62		
12	KOUNT1	INTEGER	CLIST	REFS REFS REFS	27 39 27	62 62 62		
1	KPAGE	INTEGER	CLIST	REFS REFS REFS	39 27 41	62 62 62		
242	KROW	INTEGER	CLIST	REFS REFS REFS	27 39 50	62 62 62		
5	KTPAGE	INTEGER	CLIST	REFS REFS REFS	66 66 66	66 66 66		
255	L	INTEGER	CLIST	REFS REFS REFS	63 27 48	63 63 63		
2	LINES	INTEGER	CLIST	REFS REFS REFS	27 27 27	62 62 62		
10	LINESG	INTEGER	CLIST	REFS REFS REFS	78 78 83	78 78 83		
3	LINEST	INTEGER	CLIST	REFS REFS REFS	78 78 83	78 78 83		
0	LOWTRI	INTEGER	F.P.	REFS REFS REFS	40 40 40	62 62 62		
257	LREST	INTEGER	CLIST	REFS REFS REFS	79 79 79	63 63 63		
0	LWIDE	INTEGER	F.P.	REFS REFS REFS	36 36 36	62 62 62		
262	MES	INTEGER	ARRAY	REFS REFS REFS	23 63 23	62 62 62		
245	MTRI	INTEGER	ARRAY	REFS REFS REFS	63 23 45	62 62 62		
260	NAME	INTEGER	F.P.	REFS REFS REFS	39 46 45	62 62 62		
0	NCHAR	INTEGER	COMPUT	REFS REFS REFS	45 45 45	62 62 62		
1	NCHARW	INTEGER		REFS REFS REFS	67 67 67	62 62 62		
250	NLINES	INTEGER	CLIST	REFS REFS REFS	27 37 37	62 62 62		
6	NPAGE	INTEGER		58 66 53	62 62 62			
241	NWIDE	INTEGER		66 53 53	62 62 62			
247	NWORDS	INTEGER		53 53 53	62 62 62			
0	WORK	REAL	ARRAY	F.P. REFS REFS	23 53 53	62 62 62		
VARIABLES USED AS FILE NAMES, SEE ABOVE								
EXTERNALS		TYPE	ARGS	REFERENCES				
			1	87 39 53 80 61				
STATEMENT LABELS			DEF LINE	REFERENCES				
46	20		56	76				
100	25		68	65				
112	30		72	62				
134	40		83	79				
136	10C		85	50				
217	900	FMT	89	82 63				

SUBROUTINE PRMAT1      74/74      OPT=1

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STATEMENT LABELS

226 901 FMT      DEF LINE      REFERENCES

231 902 FMT      91      73

233 903 FMT      96      66

                      98      69

LOOPS LABEL INDEX

FROM-TO LENGTH

PROPERTIES

EXT REFS

NOT INNER

EXT REFS

35 100 I 50 85 104B

103 L 69 69 4B

COMMON BLOCKS LENGTH

CLIST 11 MEMBERS - BIAS NAME(LENGTH)

0 KOUNT (1)

3 LINEST (1)

6 NPAGE (1)

9 KOUNTH (1)

0 KOMPUT (1)

STATISTICS

PROGRAM LENGTH

CM LABELED COMMON LENGTH  
52000B CM USED

305B

197

15B

13

2 LINES (1)

5 KTPAGE (1)

8 LINESG (1)

1 KPAGE (1)

4 KLABEL (1)

7 KBPAGE (1)

10 KOUNTI (1)

1 NCHARW (1)

```

1      C
1      C      SUBROUTINE PRMAT2(IUNIT,IFILE,WORK,LOWTRI,IUOUT,LWIDE,NCHAR,A)
1      C
1      C      THIS ROUTINE WRITES OUT THE NON-ZERO ELEMENTS OF A MATRIX STORED (IN
1      C      ROW SORT) ON AN I/O UNIT.
1      C
1      C      IUNIT - UNIT ON WHICH MATRIX RESIDES
1      C      IFILE - FILE ON WHICH MATRIX RESIDES
1      C      WORK - STORAGE LOCATION IN CORE LARGE ENOUGH TO CONTAIN A ROW
1      C      OF THE MATRIX
1      C
1      C      LOWTRI=0 WRITE OUT ENTIRE MATRIX
1      C      =1 WRITE OUT LOWER TRIANGLE (OF SQUARE MATRIX)
15     C
15     C      IUOUT - UNIT TO BE WRITTEN ON
15     C      LWIDE - NUMBER OF MATRIX ELEMENTS (NOT TO EXCEED 4) PER ROW OF
15     C      OUTPUT
15     C      NCHAR - NUMBER OF CHARACTERS IN DESCRIPTIVE COMMENT
15     C      A - DESCRIPTIVE COMMENT
15     C
15     C      DIMENSION WORK(1),NAME(2),ICOL(4),VALUE(4),MES(4,2)
15     C      DIMENSION HEAD(12),HEAD2(2)
15     C      DIMENSION A(1)
15     C
15     C      COMMON /CLIST / KOUNT,KPAGE,LINES,KLABEL,KTPAGE,NPAGE
15     C      COMMON /COMPUT/ KBPAGE,LINESG,KOUNT,KOUNTI
15     C
15     C      DATA MES/4HFULL,4H MAT,4HRIX ,4H
15     C      ,4HLOW,4HR TR,4HJIANG,4HLE /
15     C      DATA HEAD1/4HROW ,4H COL/
15     C      DATA HEAD2/4H V,4HALUE/
15     C
15     C      NWIDE=LWIDE
15     C      IF(NWIDE.GT.4) NWIDE=4
15     C
15     C      CALL GEDLAB(GHPRMAT2,IUNIT,NAME,IFILE,KROW,KCOL )
15     C      KLUTRI=LOWTRI
15     C      IF(KROW.NE.KCOL) KLUTRI=0
15     C      MTRI=KLUTRI+1
15     C      JMAX=KCOL
15     C
15     C      NWORDS=(NCHAR-1)/NCHARW + 1
15     C      NLINES=(NCHAR-1)/120 + 1
15     C
15     C      KOUNT=LINES
15     C
15     C      DO 100 I=1,KROW
40    C
40    C      KOUNT=LINES
40    C
40    C      CALL GETROW(IUNIT,1,WORK,KCOL )
40    C
40    C      J=0
40    C
40    C      DO 100 I=1,KROW
45    C
45    C      KOUNT=LINES
45    C
45    C      CALL GETROW(IUNIT,1,WORK,KCOL )
45    C
45    C      J=0
45    C
45    C      DO 100 I=1,KROW
50    C
50    C      KOUNT=LINES
50    C
50    C      CALL GETROW(IUNIT,1,WORK,KCOL )
50    C
50    C      J=0
50    C
50    C      DO 100 I=1,KROW
55    C
55    C      KOUNT=LINES
55    C
55    C      CALL GETROW(IUNIT,1,WORK,KCOL )
55    C
55    C      J=0
55    C
55    C      DO 100 I=1,KROW

```

```

59      J=J+1
60      C      IF(J.GT.JMAX.AND.K.GT.0) GO TO 20
61      C      IF(J.GT.JMAX.AND.K.EQ.0) GO TO 40
62      C      IF(WORK(J).EQ.0.0) GO TO 10
63
64      PRMAT2 64
65      PRMAT2 65
66      PRMAT2 66
67      PRMAT2 67
68      PRMAT2 68
69      PRMAT2 69
70      PRMAT2 70
71      PRMAT2 71
72      PRMAT2 72
73      PRMAT2 73
74      PRMAT2 74
75      PRMAT2 75
76      PRMAT2 76
77      PRMAT2 77
78      PRMAT2 78
79      PRMAT2 79
80      PRMAT2 80
81      PRMAT2 81
82      PRMAT2 82
83      PRMAT2 83
84      PRMAT2 84
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86      PRMAT2 86
87      PRMAT2 87
88      PRMAT2 88
89      PRMAT2 89
90      PRMAT2 90
91      PRMAT2 91
92      PRMAT2 92
93      PRMAT2 93
94      PRMAT2 94
95      PRMAT2 95
96      PRMAT2 96
97      PRMAT2 97
98      PRMAT2 98
99      PRMAT2 99
100     PRMAT2 100
101     PRMAT2 101
102     PRMAT2 102
103     PRMAT2 103
104     PRMAT2 104
105     PRMAT2 105
106     PRMAT2 106

```

SUBROUTINE PRMAT2 74/74 OPT=1  
 ENTRY POINTS DEF LINE REFERENCES  
 3 PRMAT2 2 104

VARIABLES	SN	TYPE	RELOCATION	F.P.	REFS	25	74	DEFINED	2
0 A		REAL	ARRAY		REFS	24	77	DEFINED	33
314 HEAD1		REAL	ARRAY		REFS	24	77	DEFINED	34
316 HEAD2		REAL	ARRAY		REFS	52	DEFINED	51	
265 I		INTEGER	ARRAY		REFS	23	80	DEFINED	65
274 ICOL		INTEGER	ARRAY	F.P.	REFS	40	DEFINED	2	
0 IFILE		INTEGER	ARRAY	F.P.	REFS	53	80	DEFINED	52
266 IR		INTEGER	ARRAY	F.P.	REFS	40	54	DEFINED	2
0 IUNIT		INTEGER	ARRAY	F.P.	REFS	86	DEFINED	2	
0 IUDUT		INTEGER	ARRAY	F.P.	REFS	80	1/0	REFS	71
270 J		INTEGER	REFS		58	60	61	62	65
262 JMAX		INTEGER	REFS		56	58	61	62	66
267 K		INTEGER	REFS		60	61	64	65	66
7 KBPAGE		INTEGER	CLIST		REFS	27	42	44	53
257 KCOL		INTEGER	CLIST		REFS	40	42	44	53
4 KLABEL		INTEGER	CLIST		REFS	43	53	DEFINED	41
260 KLUTRI		INTEGER	COMPUT		REFS	29	70	72	71
0 KOMPUT		INTEGER	CLIST		REFS	27	70	75	42
0 KOUNT		INTEGER	CLIST		REFS	87	49	72	42
11 KOUNTH		INTEGER	CLIST		REFS	27	70	75	85
12 KOUNTI		INTEGER	CLIST		REFS	27	70	75	87
1 KPAGE		INTEGER	CLIST		REFS	40	42	51	81
256 KROW		INTEGER	CLIST		REFS	27	70	75	81
5 KTPAGE		INTEGER	CLIST		REFS	71	74	2*80	DEFINED
271 L		INTEGER	REFS		80	27	49	85	
2 LINES		INTEGER	CLIST		REFS	27	49		
10 LINESG		INTEGER	CLIST		REFS	27			
3 LINEST		INTEGER	CLIST		REFS	27			
0 LOWTRI		INTEGER	CLIST		REFS	41			
0 LWIDE		INTEGER	F.P.		REFS	37			
304 MES		INTEGER	ARRAY	F.P.	REFS	23	71	DEFINED	2
261 MTRI		INTEGER	ARRAY		REFS	71		DEFINED	43
272 NAME		INTEGER	ARRAY	F.P.	REFS	23	40	71	31
0 NCHAR		INTEGER	COMPUT		REFS	46	47	73	DEFINED
1 NCHARW		INTEGER	REFS		29	46			
264 NINES		INTEGER	REFS		75	DEFINED	47		
6 NPAGE		INTEGER	CLIST		REFS	27			
255 NWIDE		INTEGER	REFS		38	67	77	DEFINED	38
263 NWORDS		INTEGER	REFS		74	DEFINED	46	66	
300 VALUE		REAL	ARRAY	REFS	23	80	66	66	
0 WORK		REAL	ARRAY	F.P.	REFS	23	54	62	DEFINED
VARIABLES USED AS FILE NAMES, SEE ABOVE									

EXTERNALS TYPE ARGS REFERENCES  
 DCLOSE 1 91  
 GEDLAB 6 40  
 GETROW 4 54  
 PLB 3 86  
 TITLES 1 69

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 SUBROUTINE PRMAT2 74/74 OPT=1  
 ENTRY POINTS DEF LINE REFERENCES  
 3 PRMAT2 2 104

VARIABLES	SN	TYPE	RELOCATION	F.P.	REFS	25	74	DEFINED	2
0 A		REAL	ARRAY		REFS	24	77	DEFINED	33
314 HEAD1		REAL	ARRAY		REFS	24	77	DEFINED	34
316 HEAD2		REAL	ARRAY		REFS	52	DEFINED	51	
265 I		INTEGER	ARRAY		REFS	23	80	DEFINED	65
274 ICOL		INTEGER	ARRAY	F.P.	REFS	40	DEFINED	2	
0 IFILE		INTEGER	ARRAY	F.P.	REFS	53	80	DEFINED	52
266 IR		INTEGER	ARRAY	F.P.	REFS	40	54	DEFINED	2
0 IUNIT		INTEGER	ARRAY	F.P.	REFS	86	DEFINED	2	
0 IUDUT		INTEGER	ARRAY	F.P.	REFS	80	1/0	REFS	71
270 J		INTEGER	REFS		58	60	61	62	65
262 JMAX		INTEGER	REFS		56	58	61	62	66
267 K		INTEGER	REFS		60	61	64	65	66
7 KBPAGE		INTEGER	CLIST		REFS	27	42	44	53
257 KCOL		INTEGER	CLIST		REFS	40	42	44	53
4 KLABEL		INTEGER	CLIST		REFS	43	53	DEFINED	41
260 KLUTRI		INTEGER	COMPUT		REFS	29	70	75	71
0 KOMPUT		INTEGER	CLIST		REFS	27	70	75	42
0 KOUNT		INTEGER	CLIST		REFS	87	49	72	42
11 KOUNTH		INTEGER	CLIST		REFS	27	70	75	85
12 KOUNTI		INTEGER	CLIST		REFS	27	70	75	87
1 KPAGE		INTEGER	CLIST		REFS	40	42	51	81
256 KROW		INTEGER	CLIST		REFS	27	70	75	81
5 KTPAGE		INTEGER	CLIST		REFS	71	74	2*80	DEFINED
271 L		INTEGER	REFS		80	27	49	85	
2 LINES		INTEGER	CLIST		REFS	27			
10 LINESG		INTEGER	CLIST		REFS	27			
3 LINEST		INTEGER	CLIST		REFS	27			
0 LOWTRI		INTEGER	F.P.		REFS	41			
304 MES		INTEGER	ARRAY	F.P.	REFS	37		DEFINED	2
261 MTRI		INTEGER	ARRAY		REFS	71		DEFINED	43
272 NAME		INTEGER	ARRAY	F.P.	REFS	23	40	71	31
0 NCHAR		INTEGER	COMPUT		REFS	46	47	73	DEFINED
1 NCHARW		INTEGER	REFS		29	46			
264 NINES		INTEGER	REFS		75	DEFINED	47		
6 NPAGE		INTEGER	CLIST		REFS	27			
255 NWIDE		INTEGER	REFS		38	67	77	DEFINED	38
263 NWORDS		INTEGER	REFS		74	DEFINED	46	66	
300 VALUE		REAL	ARRAY	REFS	23	80	66	66	
0 WORK		REAL	ARRAY	F.P.	REFS	23	54	62	DEFINED
VARIABLES USED AS FILE NAMES, SEE ABOVE									

STATEMENT	LABELS	DEF LINE	REFERENCES	
47	10	58	62	67
61	20	69	60	
105	25	76	73	
117	30	79	70	
137	40	85	61	
146	100	89	51	85
232	900	93	71	
241	901	95	80	
245	902	100	74	
247	903	102	77	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS	NOT INNER
35	100	I	51 89	114B			
110		L	77 77	4B			
122		L	80 80	11B			

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	
CLIST	11	0 KOUNT (1)	1 KPAGE (1)
		3 LINEST (1)	4 KLABEL (1)
		6 NPAGE (1)	7 KBPAGE (1)
		9 KOUNTH (1)	10 KOUNTI (1)
COMPUT	2	0 KMPUT (1)	1 NCHARW (1)

STATISTICS	PROGRAM LENGTH	331B	217
CM LABELED COMMON LENGTH		15B	13
52000B CM USED			

```

1      C45700, FUN SCAPRO          SCAPRO   2
C      *****SCAPRO   3
C      *****SCAPRO   4
C      *****SCAPRO   5
5      C*** FUNCTION SCAPRO      SCAPRO   6
C      *****SCAPRO   7
C      *****SCAPRO   8
C      *****SCAPRO   9
C      *****SCAPRO 10
C      *****SCAPRO 11
C      *****SCAPRO 12
C      *****SCAPRO 13
C      *****SCAPRO 14
C      *****SCAPRO 15
C      *****SCAPRO 16
C      *****SCAPRO 17
C      *****SCAPRO 18
C      *****SCAPRO 19
C      *****SCAPRO 20
C      *****SCAPRO 21
C      *****SCAPRO 22
C      *****SCAPRO 23
C      *****SCAPRO 24
C      *****SCAPRO 25
C      *****SCAPRO 26
C      *****SCAPRO 27
C      *****SCAPRO 28
C      *****SCAPRO 29
C      *****SCAPRO 30
C      *****SCAPRO 31
C      *****SCAPRO 32
C      *****SCAPRO 33
C      *****SCAPRO 34
C      *****SCAPRO 35
C      *****SCAPRO 36
C      *****SCAPRO 37
C      *****SCAPRO 38
C      *****SCAPRO 39
C      *****SCAPRO 40
C      *****SCAPRO 41
C      *****SCAPRO 42
C      *****SCAPRO 43

C      FUNCTION SCAPRO(X,Y,S,N,IX,IY)
25     C FOR ADDED ACCURACY ( AT A COST IN TIME ) ACTIVATE SEVERAL COMMENT
C CARDS AS SHOWN. ( NOT RECOMMENDED FOR CDC 6000 MACHINES )
C      DIMENSION X(1),Y(1)
C      FOR D.P., ACTIVATE NEXT CARD.
C      DOUBLE PRECISION S,SCAPRO
C      IF (N) 120,120,100
30     100 JX = 1
        JY = 1
        DO 110 J = 1,N
        S = S + X(JX)*Y(JY)
35     C FOR D.P., REPLACE PREVIOUS CARD WITH NEXT CARD.
        S = S + DBLE(X(JX)) * DBLE(Y(JY))
        JX = JX + 1
        110 JY = JY + 1
        120 SCAPRO = S
40     C      RETURN
        END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
4	SCAPRO	24	41

VARIABLES	SN	TYPE	RELOCATION	REFS	DEFINED	24
O IX		INTEGER	F P	REFS	38	DEFINED
O IY		INTEGER	F P	REFS	33	DEFINED
34 J	*	INTEGER	DEFINED	..	..	..

FUNCTION SCAPRO		74/74    OPT=1		FTN 4 .8+577		85/01/23 . 08 .10 .44		PAGE
VARIABLES	SN	TYPE	RELOCATION	REFS	34	38	DEFINED	32
33	JY	INTEGER	F P.	REFS	30	33	DEFINED	24
O	N	INTEGER	F P.	REFS	34	39	DEFINED	24
O	S	REAL	F P.	DEFINED	39			34
31	SCAPRO	REAL	ARRAY	REFS	27	34	DEFINED	24
O	X	REAL	ARRAY	REFS	27	34	DEFINED	24
O	Y	REAL						
STATEMENT LABELS		DEF LINE	REFERENCES					
O	100	INACTIVE	31					
O	110		38					
27	120		39					
LOOPS	LABEL	INDEX	FROM-TO	LENGTH			PROPERTIES	
21	110	J	33 38	4B			INSTACK	
STATISTICS	PROGRAM LENGTH							
	520000B CM USED		40B	32				

PAGE 1

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FUNCTION DSQRTF 74/74 OPT=1

```
1      C45700. FUN DSQRTF (SQUARE ROOT)
C
C      FUNCTION DSQRTF(ARG)
C
C      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      DOUBLE PRECISION ARG, DSQRTF
C      DSQRTF = DSQRT(ARG)
C      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
C      CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C      DSQRTF = SORT(ARG)
C      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C
C      RETURN
C
C      END
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
4 DSQRTF	3	15
VARIABLES	SN	TYPE
C ARG		REAL
10 DSQRTF		REAL
EXTERNALS	TYPE	ARGS REFERENCES
SQRT	REAL	1 LIBRARY 12
STATISTICS		
PROGRAM LENGTH		11B 9
52000B CM USED		



SUBROUTINE TAVAM      74/74      OPT = 1

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1

```

1      C45700, SUB . TAVAM (TITLE FOR AUTOMATED VIBRATION ANALYSIS MODULE)
C*****SUBROUTINE TAVAM *****
C*** OBJECTIVE   *****
C*** PRINTS THE TITLE PAGE FOR THE AUTOMATED VIBRATION ANALYSIS
10    C MODULE
C SUBROUTINE TAVAM
C
C DIMENSION AFFDL(4)
15    C
COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP
COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL ,KITPAGE ,NPAGE
1     COMMON /CTABLE / KTABLE ,KOUNTH,KOUNTI
COMMON /CTABLE / KTABLE ,NPASS ,NROWS ,NCOLS ,NCOLST ,KITABLO ,NPAGEA
1     COMMON /CAFFDL/ ITAPER
C
C PREPARE TABLE OF CONTENTS
C
25    C
COUNT = LINES
CALL TTITLE (-1)
NCOLS = 0
NROWS = 2
KTABLE = 2
CALL PTABLE (1,60,60
* H *** * * *** * * *
* H *** * * *** * * *
NROWS = 0
KTABLE = 2
CALL PTABLE (1,60,60
* H* * * * - * * * * - * * *
* H* * * * - * * * * - * * *
KTABLE = 2
CALL PTABLE (1,60,60
* H* * * * - * * * * - * * *
VIBRATION
30    C
CALL PTABLE (1,60,60
* H* * * * - * * * * - * * *
AUTOMATED
CALL PTABLE (1,60,60
* H* * * * - * * * * - * * *
ANALYSIS
40    C
CALL PTABLE (2,60,60
* H* * * * - * * * * - * * *
MODULE
45    C
COUNT = LINES
C
C LIST TITLE PAGE
C
50    C
WRITE (ITAPEW,100)
WRITE (ITAPEW,105)
WRITE (ITAPEW,110)
WRITE (ITAPEW,115)
WRITE (ITAPEW,120)
WRITE (ITAPEW,125)
WRITE (ITAPEW,126)
WRITE (ITAPEW,127)
55    C

```

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OPT = 1

## SUBROUTINE AVAM

COMMON BLOCKS	LENGTH	MEMBERS	- BIAS NAME ( LENGTH )
KLUES	24		
		69	IFL (1)
		72	IUZ (1)
		75	IFZR (1)
		78	IUBR (1)
		81	IFPHTF (1)
		84	IUMODK (1)
		87	IFPHT (1)
		90	IUQ (1)
		93	IFPH (1)
		96	TUINCK (1)
		0	KLUSE (1)
		3	KLUMD (1)
		6	NPAS (1)
		9	EPS1 (1)
		12	NFIX (1)
		15	EPS2 (1)
		18	IBAND (1)
		21	KLUQ (1)
SIZES			0 NINST (1)
			3 NNQPT (1)

STATISTICS	PROGRAM LENGTH CM	LABLED COMMON LENGTH ECD0002 CM USED
------------	----------------------	---

145B 101  
333B 219

SUBROUTINE AVAM				74/74	OPT=1	FTN 4.8+577	85/01/23. OB .10.44	PAGE
EXTERNALS	READY	TYPE	ARGS	REFERENCES				
	TAVAM		O	189				
	TIMEB		O	170				
	VIBIFO		2	201				
			5	199				
STATEMENT LABELS				DEF LINE REFERENCES				
	O 100			INACTIVE 158				
	O 150			INACTIVE 165				
	O 190			INACTIVE 176				
	21 195			177 178				
	34 198			181 175				
	O 210			187 186				
	O 290			INACTIVE 190				
	O 400			INACTIVE 200				
	121 5060		FMT	205 177				
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES			
	41 210	L	186 187	3B	INSTACK			
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)						
	CFMTA	1	O FMTA (1)					
	CLUEV	21	O KLUEV (1)					
	COMRWP	3	O ITAPER (1)					
	CTSHV	2	O LTSHV (1)					
	CTSH	3	O KTSH (1)					
	CONSTS	2	O NO (1)					
	CLIST	11	O KOUNT (1)					
			3 LINEST (1)					
			6 NPAGE (1)					
			9 KOUNTH (1)					
			O KTABLE (1)					
			3 NCOLS (1)					
			6 NPAGEA (1)					
			O FREQ (40)					
FREAKS	40							
PLACES	98							
	O IUN1 (1)				1 IUN2 (1)			
	3 IOUT2 (1)				4 IUGO1 (1)			
	6 IUGO3 (1)				7 IUGO4 (1)			
	9 IFSCR (1)				10 IFS1 (1)			
	12 IFS3 (1)				13 IFS4 (1)			
	15 IUPR (1)				16 IUA (1)			
	18 IUY (1)				19 IFY (1)			
	21 IFMEMN (1)				22 IUSTFN (1)			
	24 IUKS (1)				25 IFKS (1)			
	27 IFB (1)				28 IUDES0 (1)			
	30 IUMDBI (1)				31 IFMDBI (1)			
	33 IFADDI (1)				34 IUBALI (1)			
	36 IUDESI (1)				37 IFDESI (1)			
	39 IFWTI (1)				40 IUMEM0 (1)			
	42 IUBT (1)				43 IFBT (1)			
	45 IFDESN (1)				46 IUMD (1)			
	48 IUMEMF (1)				49 IFMEMF (1)			
	51 IFSTFO (1)				52 IUMOB (1)			
	54 IUADD (1)				55 IFADD (1)			
	57 IFBAL (1)				58 IUDESF (1)			
	60 IUWT (1)				61 IFWT (1)			
	63 IFDUM1 (1)				64 IUDUM2 (1)			
	66 IFDUM3 (1)				67 IFDUM3 (1)			

SUBROUTINE	AVAM	74/74	OPT=1	
VARIABLES	SN	TYPE	RELOCATION	
3	KLUMD	INTEGER	KLUES	REFS
1	KLUNAL	INTEGER	KLUES	REFS
25	KLUQ	INTEGER	KLUES	REFS
0	KLUSE	INTEGER	KLUES	REFS
137	KLUZ	INTEGER	KLUES	REFS
132	KMATV	INTEGER	CLIST	REFS
0	KOUNT	INTEGER	CLIST	REFS
11	KOUNTH	INTEGER	CLIST	REFS
12	KOUNTI	INTEGER	CLIST	REFS
1	KPAGE	INTEGER	CLIST	REFS
0	KPLOTV	INTEGER	F.P.	DEFINED
0	KTABLE	INTEGER	CTABLE	REFS
5	KTABLO	INTEGER	CTABLE	REFS
5	KTPAGE	INTEGER	CLIST	REFS
0	KTSH	INTEGER	CTSH	REFS
131	L	INTEGER	CLIST	REFS
2	LINES	INTEGER	CLIST	REFS
10	LINESG	INTEGER	CLIST	REFS
3	LINEST	INTEGER	CLUEV	REFS
0	NKLUEV	INTEGER	CTSH	REFS
1	LTSH	INTEGER	CTSHV	REFS
124	LTSHR	INTEGER	KLUES	REFS
0	LTSHV	INTEGER	KLUES	REFS
26	MORBAL	INTEGER	KLUES	REFS
5	MSADD	INTEGER	KLUES	REFS
13	NBAR	INTEGER	KLUES	REFS
125	NCC	INTEGER	KLUES	REFS
3	NCOLS	INTEGER	CTABLE	REFS
4	NCOLST	INTEGER	CTABLE	REFS
20	NCYC	INTEGER	KLUES	REFS
134	NCYCE	INTEGER	SIZES	REFS
4	NDEENO	INTEGER	SIZES	REFS
5	NDESYS	INTEGER	SIZES	REFS
2	NDYDF	INTEGER	SIZES	REFS
14	NFIIX	INTEGER	SIZES	REFS
126	NKLUEV	INTEGER	SIZES	REFS
21	NNN	INTEGER	KLUES	REFS
3	NNOPT	INTEGER	SIZES	REFS
0	NO	INTEGER	CONSTS	REFS
6	NPAGE	INTEGER	CLIST	REFS
6	NPAGEA	INTEGER	CTABLE	REFS
6	NPAS	INTEGER	KLUES	REFS
1	NPASS	INTEGER	CTABLE	REFS
2	NRROWS	INTEGER	CTABLE	REFS
1	NSTDOF	INTEGER	SIZES	REFS
0	NSTMEM	INTEGER	SIZES	REFS
2	TSH	REAL	ARRAY	CTSH
1	TSHV	REAL	ARRAY	CTSHV
130	VAOD	REAL		REFS
105	VAOR	REAL		REFS
10	VDES	REAL	KLUES	REFS
1	YES	INTEGER	CONSTS	REFS
	VARIABLES USED AS FILE NAMES.		SEE ABOVE	
EXTERNALS		TYPE	ARGS	REFERENCES
	CLUES		4	180
	FTCFN		6	107

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SUBROUTINE	AVAM	74/74	OPT=1
VARIABLES	SN	TYPE	RELOCATION
20	IUA	INTEGER	PLACES
66	IUADD	INTEGER	PLACES
40	IUADDI	INTEGER	PLACES
32	IUB	INTEGER	PLACES
70	IUBAL	INTEGER	PLACES
42	IUBALI	INTEGER	PLACES
116	IUBR	INTEGER	PLACES
52	IUBT	INTEGER	PLACES
16	IUCD	INTEGER	PLACES
72	IUDESF	INTEGER	PLACES
44	IUDESI	INTEGER	PLACES
54	IUDESN	INTEGER	PLACES
34	IUDESO	INTEGER	PLACES
76	IUDUM1	INTEGER	PLACES
100	IUDUM2	INTEGER	PLACES
102	IUDUM3	INTEGER	PLACES
4	IUGO1	INTEGER	PLACES
5	IUGO2	INTEGER	PLACES
6	IUGO3	INTEGER	PLACES
7	IUGO4	INTEGER	PLACES
140	IUINCK	INTEGER	PLACES
136	IUINCM	INTEGER	PLACES
0	IUIN1	INTEGER	PLACES
1	IUIN2	INTEGER	PLACES
30	IUKS	INTEGER	PLACES
104	TUL	INTEGER	PLACES
114	IULR	INTEGER	PLACES
56	IUMD	INTEGER	PLACES
64	IUMDB	INTEGER	PLACES
36	IUMDB1	INTEGER	PLACES
60	IUMEMF	INTEGER	PLACES
24	IUMEMN	INTEGER	PLACES
50	IUMEMO	INTEGER	PLACES
124	IUMODK	INTEGER	PLACES
122	IUMODM	INTEGER	PLACES
2	IOUT1	INTEGER	PLACES
3	IOUT2	INTEGER	PLACES
134	IUPH	INTEGER	PLACES
126	IUPHT	INTEGER	PLACES
120	IUPHTF	INTEGER	PLACES
17	IUPR	INTEGER	PLACES
132	IUQ	INTEGER	PLACES
130	IUQT	INTEGER	PLACES
10	IUSCR	INTEGER	PLACES
26	IUSTFN	INTEGER	PLACES
62	IUSTFO	INTEGER	PLACES
74	IUWT	INTEGER	PLACES
46	IUWT1	INTEGER	PLACES
22	IUY	INTEGER	PLACES
106	IUYT	INTEGER	PLACES
110	IUZ	INTEGER	PLACES
112	IUZR	INTEGER	PLACES
7	KBPAGE	INTEGER	CLIST
4	KLABEL	INTEGER	CLIST
24	KLUB	INTEGER	KLUES
4	KLUBAL	INTEGER	KLUES

SUBROUTINE AVAM      74 / 74      OPT = 1

RELOCATION	VARIABLES	SN	TYPE	KLUES
7	IDNOPT	7	INTEGER	PLACES
21	IFA	1	INTEGER	PLACES
67	IFADDI	1	INTEGER	PLACES
41	IFACDI	1	INTEGER	PLACES
33	IFB	1	INTEGER	PLACES
71	IFBAL	1	INTEGER	PLACES
43	IFBALI	1	INTEGER	PLACES
117	IFBR	1	INTEGER	PLACES
53	IFBT	1	INTEGER	PLACES
73	IFDESF	1	INTEGER	PLACES
45	IFDESI	1	INTEGER	PLACES
55	IFDESN	1	INTEGER	PLACES
35	IFDESO	1	INTEGER	PLACES
77	IFDUM1	1	INTEGER	PLACES
101	IFDUM2	1	INTEGER	PLACES
103	IFDUM3	1	INTEGER	PLACES
23	IFIN	1	INTEGER	KLUES
141	IFINCK	1	INTEGER	PLACES
137	IFINCM	1	INTEGER	PLACES
31	IFKS	1	INTEGER	PLACES
105	IFL	1	INTEGER	PLACES
115	IFLR	1	INTEGER	PLACES
57	IFMD	1	INTEGER	PLACES
65	IFMDB	1	INTEGER	PLACES
37	IFMDBI	1	INTEGER	PLACES
61	IFMEMF	1	INTEGER	PLACES
25	IFMEMN	1	INTEGER	PLACES
51	IFMEMO	1	INTEGER	PLACES
125	IFMODK	1	INTEGER	PLACES
123	IFMODM	1	INTEGER	PLACES
135	IFPH	1	INTEGER	PLACES
127	IFPHT	1	INTEGER	PLACES
121	IFPHTF	1	INTEGER	PLACES
133	IFQ	1	INTEGER	PLACES
131	IFQT	1	INTEGER	PLACES
11	IFSCR	1	INTEGER	PLACES
27	IFSTFN	1	INTEGER	PLACES
63	IFSTFO	1	INTEGER	PLACES
12	IFS1	1	INTEGER	PLACES
13	IFS2	1	INTEGER	PLACES
14	IFS3	1	INTEGER	PLACES
15	IFS4	1	INTEGER	PLACES
75	IFWT	1	INTEGER	PLACES
47	IFWTI	1	INTEGER	PLACES
23	IFY	1	INTEGER	PLACES
107	IFYT	1	INTEGER	PLACES
111	IFZ	1	INTEGER	PLACES
113	IFZR	1	INTEGER	PLACES
136	INDEX1	1	INTEGER	KLUES
2	IRED	1	INTEGER	
133	IRW	1	INTEGER	
127	IRWD	1	INTEGER	
135	ISCR	1	INTEGER	
2	ITAPCD	1	INTEGER	COMRWP
0	ITAPER	1	INTEGER	COMRWP
7	ITAPET	1	INTEGER	CTABLE
1	ITAPFW	1	INTEGER	COMRWP

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199  
184  
199  
DEFINED  
164  
199  
180  
I/O REFS

192  
192  
176  
177

SUBROUTINE AVAM

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```

C READ INPUT DATA
C ... PSN(190) TO PSN(290)
C ... IF (NCYC .GT. 0) GO TO 198
175 190 REWIND ITAPER
195 READ (ITAPER,5060) VAOOD
IF (VAOOD .NE. VAORR) GO TO 195
READ (ITAPER,FMTA) (TSHV(L), L=1,LTSHR)
CALL CLUES (ITAPER,NCC,NKLUEV,KLUEV)
198 CONTINUE
C
C
      KMATV = IREQ + 1
      KPLOTV=KLUEV(2)
      DQ 210 L=1,LTSH
      210 TSH(L) = TSHV(L)
C
      CALL READY
      290 CONTINUE
C
      IROW = NOYDFF
C
C SOLVE FOR EIGENVALUES AND EIGENVECTORS
C
      NCYCE= NCYC
      CALL EIGEN (IROWD,KMATV,ISCR,IROW,NCYCE,INDEX1)
      KLUZ = KLUSE
      CALL VIBF0 (ISCR,IROW,NCYCE,INDEX1,KLUZ)
      400 CONTINUE
      CALL TIMEB (37, 37)FROM AVAM - END OF VIBRATION ANALYSIS)
C
C
      C FORMATS
      5060 FORMAT ( 18A4 )
C
      RETURN
      END

```

AVAM

179

NCYCE	NCYC
CALL EIGEN	(IROWD,KMATV,ISCR,IROW,NCYCE,INDEX1)
KLUZ	= KLUSE
CALL VIBF0	(ISCR,IROW,NCYCE,INDEX1,KLUZ)

400	CONTINUE
CALL TIMEB	(37, 37)FROM AVAM - END OF VIBRATION ANALYSIS)

C	
C	
C FORMATS	
5060	FORMAT ( 18A4 )

C	
RETURN	
END	

205	
207	
AVAM	208
AVAM	209

22	I BAND
----	--------

195	
196	
AVAM	197
AVAM	198
AVAM	199
AVAM	200
AVAM	201
AVAM	202
AVAM	203
AVAM	204
AVAM	205
AVAM	206
AVAM	207
AVAM	208
AVAM	209

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 AVAM	114	207

VARIABLES	SN	TYPE	RELOCATION	REFERENCES
15 D		REAL	KLUES	REFS
27 DBAL		REAL	KLUES	REFS
16 DEL		REAL	KLUES	REFS
12 DMAX		REAL	KLUES	REFS
11 EPS1		REAL	KLUES	REFS
17 EPS2		REAL	KLUES	REFS
O FMTA		REAL	ARRAY	CFMTA
O FREQ		REAL	ARRAY	FREAKS
22 IBAND		INTEGER	KLUES	REFS

```

      74/74   OPT=1           FTN 4.8+577    85/01/23. 08.10.44   PAGE   3

115      C   INTEGER YES
          C
          C   DIMENSION FMTA(1)
          C   DIMENSION KLUEV(20)
          C   DIMENSION FREQ(40)
          C   DIMENSION TSH(1)      .TSH(1)

120      C
          C   COMMON /CFMTA / FMTA
          C   COMMON /CLUEV / LKLUEV,KLUEV
          C   COMMON /COMRWP/ ITAPER,ITAPEW,ITAPER
          C   COMMON /CTSHV / LTSHV ,TSHV
          C   COMMON /CTSH / KTSV ,LTSH ,TSH
          C   COMMON /CONSTS/ NO   ,YES
          C   COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE
          C   COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS ,NCOLST,KTABLO,NPAGEA
          C   COMMON /FREAKS/ FREQ
          C   COMMON /PLACES/ IUN1,IUN2,IUOUT1,IUOUT2,IUGO1,IUGO2,IUGO3,IUGO4,
          C   IUSCR,IFSCR,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR,
          C   IUA,IFA,IUY,IFY,IUMEMN,IUMEMN,IUSTFN,IUFSTFN,
          C   IUKS,IFKS,IUB,IFB,IUDESO,IUDESO,
          C   IUMDBI,IUMDBI,IUADDI,IUADDI,IUBALI,IUBALI,
          C   IUDESI,IUDESI,IUWTI,IUWTI,
          C   IUMEMO,IUMEMO,IUBI,IFBT,
          C   IUDESN,IUDESN,TUMD,IFMD,
          C   IUMEMF,IUMEMF,
          C   IUSTFO,IUFSTFO,IUMDB,IFMDB,IUADD,IUFBD,IFBAL,
          C   IUDESF,IUDESF,IUWT,IUWT,
          C   IUDUM1,IUDUM1,IUDUM2,IUDUM2,IUDUM3,IUDUM3,
          C   IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IFZR,IUZR,IFLR,
          C   IUBR,IFBR,
          C   IUPHTF,IUPHTF,IUMODM,IFMODM,
          C   IUMODK,IFMODK,IUPHT,IFPHT,IUQT,IFQ,IUQ,IFQ,
          C   IUPH,IFPH,IUINCM,IUINCK,IFINCK
          C   COMMON/KLUES/ KLUSE,KLUNAL,IRED,KLUND,KLUBAL,MSADD,NPAS, IDNOPT,
          C   VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NINN,IBAND,
          C   IFIN,KLUB,KLUQ,MORBAL,DBAL
          C   COMMON /SIZES / NSTMEM,NSTDFF,NDYDOF,NNOPT,NDENSND,NDESYS
          C
          C   INITIAL CONDITIONS
          C   PSN(100) TO PSN(150) .....
          100  CONTINUE
          C   LTSHR = LTSV
          C   IF (KTSV .EQ. YES) LTSHR = LTSHR - LTSHR-2
          C   DATA VAOR /4HVAA0/
          C   NCC = 10
          C   NKLUEV=LKLUEV
          C   IROWD = 220
          150  CONTINUE
          C
          C   PRINT TITLE FOR AUTOMATED VIBRATION ANALYSIS MODULE
          C   CALL TAVAM
          C

```

OPT = 1

FIN 4 8+577

2

1 C 45700, SUB AVAM (AUTOMATED VIBRATION ANALYSIS MODULE)

2 AVAM

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1 C 45700, SUB AVAM (AUTOMATED VIBRATION ANALYSIS MODULE)

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1 C 45700, SUB AVAM (AUTOMATED VIBRATION ANALYSIS MODULE)

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1 C 45700, SUB AVAM (AUTOMATED VIBRATION ANALYSIS MODULE)

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1 C 45700, SUB AVAM (AUTOMATED VIBRATION ANALYSIS MODULE)

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1 C 45700, SUB AVAM (AUTOMATED VIBRATION ANALYSIS MODULE)

2 AVAM

</

	FUNCTION RDM	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE
1	C4500. FUN RDM (RANDOM FUNCTION)					1
C	FUNCTION RDM (ARG)					
C	CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS					
C	DATA IY /5757403/				RDM	2
C	IY = IY*65539				RDM	3
C	IF (IY GE 0) GO TO 6				RDM	4
C	IY = IY + 2147483647 + 1				RDM	5
C	6 YFL = IY				RDM	6
C	RDM = YFL*0.4656613E-09				RDM	7
C	CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS				RDM	8
C	CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				RDM	9
C	RDM = RANF (ARG)				RDM	10
C	CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				RDM	11
C	RETURN				RDM	12
20	END				RDM	13

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
4 RDM	3	19				
VARIABLES	SN	TYPE	RELOCATION F.P.	REFS	DEFINED	DEFINED
0 ARG		REAL		16	16	16
11 RDM		REAL				
INLINE FUNCTIONS	TYP	ARGS	DEF LINE	REFERENCES		
RANF	REAL	1 INTRIN	16			
STATISTICS						
PROGRAM LENGTH						
52000B CM USED						
	128	10				

	FUNCTION CDABSF	74/74	OPT=1	FTN 4.8+577	85/01/23	08.10.44	PAGE	1
1	C45700.	FUN.	CDABSF (ABSOLUTE VALUE)					
C	FUNCTION	CDABSF (ARG)						
C	CIBM	BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS						
C	COMPLEX*16 ARG							
C	DOUBLE PRECISION CDABSF							
C	CDABSF = CDABS(ARG)							
CIBM	ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS							
1C	C	BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS						
CCDC	COMPLEX ARG							
C	CDABSF = CABS(ARG)							
CCDC	ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS							
15	C	RETURN						
	END							

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
4 CDABSF	3	17
VARIABLES	SN TYPE	RELOCATION
O ARG	COMPLEX	F.P.
11 CDABSF	REAL	
EXTERNALS	TYPE	REFS
CABS	REAL	DEFINED
STATISTICS	ARGS	13
PROGRAM LENGTH	1 LIBRARY	14
52000B CM USED	REFERENCES	14
	12B	10

	FUNCTION DCMLPF	74/74	OPT=1	FTN 4.8+577	85/01/23	08.10.44	PAGE 1
1	C45700. FUN. DCMLPF (COMPLEX FUNCTION)						
	C				DCMLPF	2	
	CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS				DCMLPF	3	
	C	COMPLEX FUNCTION DCMLPF * 16 (ARG1,ARG2)			DCMLPF	4	
	C	DOUBLE PRECISION ARG1, ARG2			DCMLPF	5	
5	C	DCMLPF = DCMLPX (ARG1,ARG2)			DCMLPF	6	
	CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS				DCMLPF	7	
	C				DCMLPF	8	
	C				DCMLPF	9	
	C				DCMLPF	10	
	CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				DCMLPF	11	
	C	COMPLEX FUNCTION DCMLPF (ARG1,ARG2)			DCMLPF	12	
	DCMLPF = CMPLX (ARG1,ARG2)				DCMLPF	13	
	CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				DCMLPF	14	
	C				DCMLPF	15	
10					DCMLPF	16	
	RETURN				DCMLPF	17	
15	END						

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	RELOCATION	REFS	12	DEFINED
5 DCMLPF	11	15	F.P. F.P.	REFS REFS	12	DEFINED
VARIABLES	SN	TYPE			11	DEFINED
0 ARG1		REAL			11	DEFINED
0 ARG2		REAL			11	DEFINED
13 DCMLPF		COMPLEX			12	DEFINED
INLINE FUNCTIONS	TYPE	ARGS			12	DEFINED
CMPLX	COMPLEX	2	INTRIN	DEF LINE	12	DEFINED
STATISTICS				REFERENCES		
PROGRAM LENGTH						
52000B CM USED						
					13	

SUBROUTINE TAVAM 74/74 OPT=1

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115 V.13HVVV VVV ..,4X,1H\*)  
\* .26X, 36H.  
115 FORMAT ( ..,5X,1H\*,15X  
A,13H AAA AAA  
\* ,13X  
V.13H VVV VVV ..,4X,1H\*)  
\* .26X, 36H.  
\* / ,5X,1H\*,15X  
A,13H AAA AAA  
\* ,13X  
V.13H VVV VVV ..,4X,1H\*)  
\* .26X, 36H.  
\* / ,5X,1H\*,15X  
A,13H AAA AAA  
\* ,13X  
V.13H VVV VVV AIR FORCE ..,4X,1H\*)  
120 120 FORMAT ( ..,5X,1H\*,15X  
A,13H AAA AAA  
\* ,13X  
V.13H VVV VVV ..,4X,1H\*)  
\* .26X, 36H.  
\* / ,5X,1H\*,15X  
A,13HAAA AAA  
\* ,13X  
V.13H VVV VVV ..,4X,1H\*)  
\* .26X, 36H.  
\* / ,5X,1H\*,15X  
A,13HAAA AAA  
\* ,13X  
V.13H VVV VVV ..,4X,1H\*)  
\* .26X, 36H.  
\* / ,5X,1H\*,15X  
A,13HAAA AAA  
\* ,13X  
V.13H VVV VVV ..,4X,1H\*)  
125 125 FORMAT ( ..,5X,1H\*,15X  
A,13HAAA AAA  
\* ,13X  
V.13H VVV VVV ..,4X,1H\*)  
\* .26X, 36H.  
\* / ,5X,1H\*,41X  
V.13H VVV VVV ..,4X,1H\*)  
\* ,13X  
A,13H A  
\* .36H. ....,4X,1H\*)  
\* / ,5X,1H\*,41X  
V.13H VVV VVV ..,4X,1H\*)  
\* ,13X  
A,13H AAAA  
\* .40X,1H\*)  
130 130 FORMAT ( ..,5X,1H\*,41X  
V.13H VVV VVV ..,4X,1H\*)  
\* ,13X  
A,13H AAAA  
\* .40X,1H\*)  
\* / ,5X,1H\*,41X

TAVAM 116  
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TAVAM 172

SUBROUTINE	TAVAM	74/74	OPT=1
V	13H	VVV VVV	
	*	. 13X	
	A.	13H AAAAA	
	.	. 40X, 1H*	
	*	. / . 5X, 1H*. 41X	
	V.	13H VVV VVV	
	*	. 13X	
	A.	13H AAA AAA	
	*	. 40X, 1H*)	
135	FORMAT (		
	*	5X, 1H*, 41X	
	V.	13H VVV VVV	
	*	. 13X	
	A.	13H AAA AAA	
	*	. 40X, 1H*	
	*	. / . 5X, 1H*. 41X	
	V.	13H VVV VVV	
	*	. 13X	
	A.	13H AAA AAA	
	*	. 40X, 1H*	
	*	. / . 5X, 1H*. 41X	
	V.	13H VVV VVV	
	*	. 13X	
	A.	13H AAA AAA	
	*	. 40X, 1H*)	
140	FORMAT (		
	*	5X, 1H*, 41X	
	V.	13H VVV	
	*	. 13X	
	A.	13H AAA AAA	
	*	. 40X, 1H*	
	*	. / . 5X, 1H*. 41X	
	V.	13H V	
	*	. 13X	
	A.	13H AAAAAAAA	
	*	. 40X, 1H*	
	*	. / . 5X, 1H*. 67X	
	A.	13H AAAAAAAA	
	*	. 13X	
	M.	13HMMM MMM	
	*	. 14X, 1H*)	
145	FORMAT (		
	*	5X, 1H*, 2X	
	*	. 65X	
	A.	13H AAAA AAA	
	*	. 13X	
	M.	13HMMM MMM	
	*	. 14X, 1H*	
	*	. / . 5X, 1H*. 2X	
	*	. 65X	
	A.	13H AAA AAA	
	*	. 13X	
	M.	13HMMM MMM	
	*	. 14X, 1H*	
	*	. / . 5X, 1H*. 2X	
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0.0			
5			

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TAVAM	173	
TAVAM	174	
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TAVAM	227	



SUBROUTINE TAVAM 74/74 OPT=1

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* 26X          TAVAM    287
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    288
165 FORMAT ( TAVAM    289
* 5X, 1H*,2X  TAVAM    290
* ,5X, 15H, AEROSPACE ,4X
* ,26X          TAVAM    291
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    292
* ,/ ,5X,1H*,2X  TAVAM    293
* ,5X, 15H, CORPORATION ,4X
* ,26X          TAVAM    294
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    295
* ,/ ,5X,1H*,2X  TAVAM    296
* ,5X, 15H, 4OH GGGGGGGGGG
* ,26X          TAVAM    297
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    298
* ,/ ,5X,1H*,2X  TAVAM    299
* ,5X, 15H, 4OH GGGGGGGGG
* ,26X          TAVAM    300
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    301
* ,/ ,5X,1H*,2X  TAVAM    302
* ,5X, 15H, 4OH GGGGGGGG
* ,26X          TAVAM    303
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    304
* ,/ ,5X,1H*,2X  TAVAM    305
* ,5X, 15H, 4OH GGGGGGGG
* ,26X          TAVAM    306
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    307
* ,/ ,5X,1H*,2X  TAVAM    308
* ,5X, 15H, 4OH GGGGGGGG
* ,26X          TAVAM    309
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    310
* ,/ ,5X,1H*,2X  TAVAM    311
* ,5X, 15H, 4OH GGGGGGGG
* ,26X          TAVAM    312
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    313
* ,/ ,5X,1H*,2X  TAVAM    314
* ,24X, 4OH GGGG
* ,26X          TAVAM    315
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    316
* ,/ ,5X,1H*,2X  TAVAM    317
* ,24X, 4OH GG
* ,26X          TAVAM    318
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    319
* ,/ ,5X,1H*,2X  TAVAM    320
* ,24X, 4OH G
* ,26X          TAVAM    321
M, 13HMMM   MMM  MMM
* ,14X,1H*   TAVAM    322
* ,/ ,5X,1H*,2X  TAVAM    323
* ,24X, 4OH G
* ,26X          TAVAM    324
M, 13HMMM   MMM  MMM
* ,14X,1H*,14X,1H*   TAVAM    325
* ,/ ,5X,1H*,120X,1H*,/ ,5X,122(1H*) )
* ,26X          TAVAM    326
C      RETURN
      END
175 FORMAT ( 5X,1H*,120X,1H*,/ ,5X,122(1H*) )
330
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES  
1 TAVAM 12 330



SUBROUTINE TAVAM		74 / 74	OPT = 1	FTN 4 . 8 + 577	85 / 01 / 23 . 08 . 10 . 44	PAGE 8
COMMON BLOCKS	LENGTH	MEMBERS	- BIAS NAME( LENGTH )			
		3	NCOLS ( 1 )	4	NCOLST ( 1 )	
		6	NPAGEA ( 1 )	7	ITAPET ( 1 )	
CAFFDL	4	0	AFFDL ( 4 )			
<b>STATISTICS</b>						
PROGRAM LENGTH		1104B	580			
CM LABELED COMMON LENGTH		32B	26			
52000B CM USED						

SUBROUTINE READY 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 1  
 1 C SUBROUTINE READY READY 2  
 C C C BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS READY 3  
 C DOUBLE PRECISION ELSTF READY 4  
 C DOUBLE PRECISION BUFFD(220) READY 5  
 C1BM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS READY 6  
 C C  
 C DIMENSION WORK(28000),BUFFER(310) READY 7  
 C DIMENSION MUMU(1),IDJ(4),FACTJ(4),JCHART(4,1),JCHART(4,1).CHART(4,1) READY 8  
 C DIMENSION NUMB(10),VALUE(10) READY 9  
 C DIMENSION ROE(15) READY 10  
 C DIMENSION NAME(2),NAM1(2),NAM2(2),NAM3(2),NAM4(2) READY 11  
 C DIMENSION IPOS(20) READY 12  
 C DIMENSION J1(3),MB(1) READY 13  
 C DIMENSION MSTOR(1),KSTOR(1),F(3),G(3) READY 14  
 C DIMENSION B(3),C(3),IJS(6),IJD(6) READY 15  
 C DIMENSION S(6),T(6) READY 16  
 C DIMENSION NAMFLX(2) READY 17  
 C DIMENSION DMAPNM(2) READY 18  
 C C EQUIVALENCE (WORK(1),IWORK,JCHART(1,1),CHART(1,1)) READY 19  
 C \* (BUFFER(1),IBUF),(ROE(1),IROE),(MB(1),NMBAL) READY 20  
 C \*\*\*\*\*  
 C \* THE FOLLOWING LINE OF FASTOP CODE HAS \*  
 C \* BEEN COMMENTED OUT BECAUSE IT IS NOT \*  
 C \* USED IN THE CURRENT VERSION OF ESP. \*  
 C \*\*\*\*\*  
 C \* EQUIVALENCE (PATTY(1),MEM),(PATTY(2),NODES),(PATTY(3),IROW). \*  
 C \* (PATTY(4),ICOL),(PATTY(5),WT),(PATTY(6),MEMTYP) \*  
 C EQUIVALENCE (M\$TOR(1),NUMSTR) . (K\$TOR(1),ICYCLE) \*  
 C COMMON/BAL/ NMBAL,IBAL(20),VMBIN(20),VMBOLD(20),VMBNEW(20). \*  
 C 1 MBDOF(20,3),DRVMB(20),DRWMBO(20), \*  
 C 2 \$1MB(20),S2MB(20),S3MB(20) \*  
 C \*\*\*\*\*  
 C \* THE FOLLOWING LINE OF FASTOP CODE HAS \*  
 C \* BEEN COMMENTED OUT BECAUSE IT IS NOT \*  
 C \* USED IN THE CURRENT VERSION OF ESP. \*  
 C \*\*\*\*\*  
 C COMMON /ELMNT/ ELSTF(24,24),PATTY(6),NSTART(B),NGO(8) \*  
 C COMMON/COLS/ IT,IMINT,IMAXT,IDEVS,IOLDT,IOLDW,ISRAT,IMINTO, \*  
 A INITT,INPUT, \*  
 NVAR,JWPUT,JINITT,JMINTT,JMAXT,JOLDT,JNEWT,JDRV, \*  
 1 JDRVQ,JSPR1,JSPR2,JSPR3 \*  
 2 COMMON/SIZES/ NSTMEM,NSTDFF,NDYDF,NNOPT,INDESNO,INDESYS, \*  
 COMMON/PLACES/ IUN1,IUN2,IUQUT1,IUQUT2,IUGO1,IUGO2,IUGO3,IUGO4, \*  
 1 IUSCR,IFSCR,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR, \*  
 2 IUA,IFA,IUY,IFY,IUNEMN,IFMEMN,IUSTFN,IFSTFN, \*  
 3 IUKS,IFKS,IUB,IFB,IUDESO,IFDESO, \*  
 4 IUMDRT,TFMDRT,TUANDT,TFANDT,TURAI,TFRALI. \*  
 \*\*\*\*\*  
 50 \*\*\*\*\*  
 55 \*\*\*\*\*  
 58 \*\*\*\*

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					2
5	IUDESI, IFODESI, IUTTI, IFWTI,				READY 59
6	IUMEMO, IFMEMO, IUBT, IFBT,				READY 60
60	IUDESN, IFDESN, IUND, IFMD,				READY 61
7	IUMEMF, IFMEMF,				READY 62
8	IUSTFO, IFSTFO, IUNDB, IFMDB, IUADD, IFADD, IUBAL, IFBAL,				READY 63
9	IUDESF, IFDESF, IUNT, IFWT,				READY 64
A	IUDUM1, IFDUM1, IUDUM2, IFDUM2, IUDUM3, IFDUM3,				READY 65
B	IUL, IFL, IUYT, IFYT, IUZ, IFZ, IUZR, IFZR, IULR, IFLR,				READY 66
C	IUBR, IFBR,				READY 67
D	IUPHTF, IFPHTF, IUMODM, IFMODM,				READY 68
E	IUMODK, IFMODK, IUPHT, IFPHT, IUQT, IFQT, IUQ, IFQ,				READY 69
F	IUPH, IFPH, IUINCM, IFINCM, IUINCK, IFINCK				READY 70
G	COMMON/IKLUES/ KLUSE, KLUANL, IRED, KLUND, KLUBAL, MSADD, NPASS, IDNO <sup>PT</sup> ,				READY 71
1	VDES, EPS1, DMAX, NBAR, NFIX, D, DEL, EPS2, NCYC, NNN, ICAND,				READY 72
2	IFIN, KLUB, KLUQ, MORBAL, DBAL				READY 73
	COMMON/WAYTS/ WINITT, WST, WMB, WBOTH, WPRES, DW				READY 74
75	COMMON/CBYTES/ NBYTES				READY 75
	COMMON/FILE/ IPOS				READY 76
	COMMON/CORE/ KORE	KOREDP			READY 77
	COMMON/CLIST/ KOUNT	KPAGE	INES	KLABEL, KTPAGE, NPAGE	READY 78
1	COMMON/STORES/ NUMSTR, KCONST, ISTDFF(5,6), IDYDOF(5,6), IDSTR(5)				READY 79
A	STRW1(5,3), STRW0(5), STRWN(5,3), STR11(5,3), STRQ(5,3)				READY 80
B	STRW1(5,3), STRR15(5,3), STR0(5,3), STRRN(5,3)				READY 81
C	STRWD0(5), STRWN0(5), STRD0(5,3), STRDN(5,3)				READY 82
D	STRRD0(5,3), STRRN(5,3), SCALE(5,13)				READY 83
E	STRFI(5,6), STRFO(5,6), STRFN(5,6)				READY 84
F	STRFDD(5,6), STRFDN(5,6)				READY 85
80	COMMON/STRCLU/ ICYCLE, ISTEP, M1, M2, M3, M4, VS, VOLD, VNEW, STPOLD				READY 86
	COMMON/LLOCSTR/ IUSTRI, IFSTRI, IUMREF, IFMREF				READY 87
85	1 COMMON/RESIZE/ TSIZE, SCLNEW(5,4), SCOLD(5,4), ITESTO, SAVSTP, IDUB				READY 88
	COMMON/ACCEL/ ISTOP, IPAR, DNNEW(5), DINEW(5,3), DWOLD(5), DIOLD(5,3)				READY 89
90	1 COMMON/COMRWP/ ITAPER, ITAPEW, ITAPEP				READY 90
	COMMON/INVERT/ INVERT, IUA2, IFLEX, AORD(30), IPERM(30), NSTOR(30,2)				READY 91
	A, IPREV, NDFF				READY 92
95	COMMON/VSAVE/ VSAVE, VOSAVE				READY 93
	COMMON/CLUEV/ LKLUEV, KLUEV(20)				READY 94
C	DATA NAME /4HMEMB, 4HERS /				READY 95
	DATA NAM1/4HDESA, 4HRRAY /				READY 96
	DATA NAMFLX /4HDYNF, 4HLEX /				READY 97
	C KORE = 28000				READY 98
	KOREDP=KORE/2				READY 99
100	C CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				READY 100
	KOREDP=KORE				READY 101
	CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				READY 102
105	C CALL PROGNA(4H(REA, 4HDY ))				READY 103
	KOUNT=LINES				READY 104
	CALL MESSAGE( 1, 5, 5HREADY )				READY 105
110	C CALL TIMEB(10, 1CHFROM READY)				READY 106
					READY 111
					READY 112
					READY 113
					READY 114
					READY 115

```

115      C **** THE FOLLOWING LINE OF FASTOP CODE HAS *
C * BEEN COMMENTED OUT BECAUSE IT IS NOT
C * USED IN THE CURRENT VERSION OF ESP.
C ****
120      C CALL OSIOPT
C
C INITIALIZATIONS
C
125      CIBM  IFLEXS = 8
CIBM
CCDC  IFLEXS = 5
CCDC  IFLEXI = 20
IT=26
IMINT=84
IMAXT=85
IDENS=94
IOLDT=97
IOLDW=96
ISRAT=95
IMINTO=99
INITT=98
IINPUT=100
C
NVAR=12
JINPUT=2
JINITT=3
JMINT=4
JMAXT=5
JQLOT=6
JNEWT=7
JDRV=8
JDRVDO=9
JSPRI=10
JSPP2=11
JSPPR3=12
C
IF(NCYC.GT.0) GO TO 95
NCYC=0
IBAND=0
IFIN=KLUSE
C
KLUB=0
C **** KLUB IS ALWAYS SET TO ZERO IN THE CURRENT
C * VERSION OF ESP. THIS CAUSES CERTAIN
C * OPERATIONS IN READY, AFOM, AND DRTV
C * TO BE BY-PASSED.
C * (IN FASTOP, THE ABOVE STATEMENT IS
C * 'KLUB=1' )
C ****
160      C
165      C
170      C
TEITDRN FOR 01 VIM-0

```



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```

230      C IPOS(IUMENN)=IFMEMN
230      C CALL GEDLAB(BHREADY 01,IUMENN,NAME,IFMEMN,KROW,KCOL)
230      C NSTMEM=KROW
230      C CALL DCLOSE(IUMENN)
230      C IF(IRED.EQ.0) GO TO 40
230      C IPOS(IUY)=IFY
230      C CALL GEDLAB(BHREADY 02,IUY,NAME,IFY,KROW,KCOL)
230      C NSTDOF=KROW
230      C NDYDOF=KCOL
230      C CALL DCLOSE(IUY)
230      C GO TO 50
240      C 40 IPOS(IUKS)=IFKS
240      C CALL GEDLAB(BHREADY 03,IUKS,NAME,IFKS,KROW,KCOL)
240      C NSTDOF=KROW
240      C NDYDOF=NSTDOF
245      C 50 CONTINUE

250      C
250      C IF(KLUNAL.EQ.0) GO TO 95
250      C IF(NPASS.EQ.0.AND.KLUSE.LT.2) GO TO 95
250      C LIST STRESS RATIOS FOR STRUCTURAL ELEMENTS WHICH ARE FREE TO
250      C REIZED IN SOP.
255      C CALL GEDLAB(BHREADY 04,IUMENN,NAME,IFMEMN,KROW,KCOL)
255      C KOUNT=LINES
255      C NFREE=0
255      C K=0

260      C DD 90 I=1,KROW
260      C IR=I
260      C CALL GETROW(IUMENN,1,BUFFER,KCOL)
260      C IF(BUFFER(IMINT).EQ.BUFFER(IMAXT)) GO TO 60
260      C K=K+1
260      C NFREE=NFREE+1
260      C NUMB(K)=IBUF
260      C VALUE(K)=BUFFER(1$RAT)
260      C 60 IF(K.EQ.5) GO TO 65
260      C IF(IR.EQ.KROW.AND.K.GT.0) GO TO 65
260      C GO TO 90
260      C 65 CALL TITLES(2)
260      C IF(KOUNT.GT.KOUNTH) GO TO 70
260      C WRITE(IUPR,9004)
260      C KOUNT=KOUNT+5
260      C 70 WRITE(IUPR,9005) (NUMB(L),VALUE(L),L=1,K)
260      C KOUNT=KOUNT+1
260      C 90 CONTINUE

280      C **** END OF CODE THAT HAS BEEN COMMENTED OUT. ****
280      C **** READ DYNAMIC FLEXIBILITY MATRIX FROM EXTERNAL SOURCE
280      C (VIA UNIT 20), AND WRITE ON FILE 1 OF UNIT 8.
285      C

```

SUBROUTINE READY 74/74 OPT=1

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```
KCOL = NDYDOF  
KROW = NDYDOF  
REWIND IFLEXI  
CALL PUDLAB (BHREADY 12, IFLEXS, NAMFLX, 1, KROW, KCOL)  
IF (IDYFLX .NE. 0)  
 1CALL NASTRD (IDYFLX, IFLEXI, 1, 1, NDYDOF, NDYDOF, BUFFER)  
 1IF (IDYFLX .EQ. 0 AND KLUEV(7) .EQ. 2)  
 1WRITE (6, 9027) KROW, KCOL  
 1DO 92 I=1, KROW  
 1IF (IDYFLX .EQ. 0)  
 1READ (IFLEXI, 9026) (BUFFER(K), K=1, KCOL)  
 1IF (IDYFLX .EQ. 0 AND KLUEV(7) .EQ. 2)  
 1WRITE (6, 9028) I, (BUFFER(K), K=1, KCOL)  
 1IF (IDYFLX .NE. 0)  
 1CALL NASTRD (IDYFLX, IFLEXI, 1, 1, 2, NDYDOF, NDYDOF, BUFFER)  
 1CALL PUTROW (IFLEXS, -1, BUFFER, KCOL)  
92 CONTINUE  
CALL DCLOSE (IFLEXS)  
IF (IDYFLX .EQ. 2)  
 1CALL NASTRD (IDYFLX, IFLEXI, 1, 1, 3, NDYDOF, NDYDOF, BUFFER)  
C 95 CONTINUE  
C  
C IF (NPASS .NE. 0) GO TO 400  
C IF (NCYC .GT. 0) GO TO 700  
C ****  
C * THE FOLLOWING LINES OF FASTOP CODE HAVE *  
C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT *  
C * USED IN THE CURRENT VERSION OF ESP. *  
C ****  
C NPASS=0 DO SOME OR ALL OF THE FOLLOWING-DEPENDING ON THE CURRENT  
C USE OF THE PROGRAM.  
C  
C 1. IF NON-OPTIMUM FACTORS AND/OR FIXED GAGE ELEMENTS ARE PRESENT,  
C READ ASSOCIATED DATA INTO CORE.  
C 2. IF NON-OPT FACTORS ARE PRESENT, UPDATE ELEMENT STIFFNESS FILE.  
C 3. UPDATE THE MEMBER MATRIX.  
C A. COPY ORIGINAL SET OF MINIMUM ALLOWABLE GAGES ONTO COL IMINTO.  
C B. COPY SET OF CURRENT GAGES ONTO COL IINIT.  
C C. INSERT WEIGHT PER UNIT GAGE INTO COL INPUT.  
C 4. CONSTRUCT THE DESIGN ARRAY.  
C 5. READ IN MASS BALANCE DATA(CARDS)-IF ANY.  
C  
C NNOPT=0  
C NDESNO=0  
C  
C 1IF (IDNOPT .NE. 1) GO TO 145  
C  
C K=0  
C NBAD=0  
C 100 READ(IUCD, 9002) (MUMJ(I), IDJ(I), FACTJ(I), I=1, 4)  
C IF (MUMJ(1) .EQ. 0) GO TO 115  
C DO 110 I=1, 4  
C IF (MUMJ(I) .EQ. 0) GO TO 100
```

```

READY 344
READY 345
READY 346
READY 347
READY 348
READY 349
READY 350
READY 351
READY 352
READY 353
READY 354
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READY 394
READY 395
READY 396
READY 397
READY 398
READY 399
READY 400

```

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```

400      C   J=0
        C   135  CONTINUE
        C
        C   LEFT=LINES-KOUNT
        C   IF(LEFT.GE.3) GO TO 10
        C   KOUNT=LINES
        C   CALL TITLES(2)
        C   138  IF(INTIME.EQ.1) WRITE(6,1)
        C           IF(INTIME.EQ.2) WRITE(6,2)
        C   KOUNT=KOUNT+3
        C   140  CONTINUE

```

READY 401  
READY 402  
READY 403  
READY 404  
READY 405  
READY 406  
READY 407  
READY 408  
READY 409  
READY 410  
READY 411

(LUPR,9010) NDESNO  
(LUPR,9011) NNOPN

```
415      C **** END OF CODE THA ****
          C
          C ASSIGN UNITS AND FILES.
          C
          C CALL UNFIL(-1)
          C
          C
```

\*\*\*\*\*  
C \* THE FOLLOWING  
C \* BEEN COMMENTED  
C \* USED IN THE CUE  
C \*\*\*\*\*  
C IF(KLUSE,NE.2,AND.KL  
C  
C 425  
C  
C 430

```
CALL GEDLAB(BHREADY  
IUSIFO=IDUM3-IUSIFO  
IFSTFN=IFDUM3-IFSTFN  
IFSTFO=IFDUM3-IFSTFO
```

```

DO 200 I=1,NSTMEM
CALL PREAD(LUSTEQ,PAITY(1),24)

```

```

IF(I.GT.KMAX)GO TO 150
IF(MEM.NE.JCHART(1,I)) GO TO 150
J=I
GO TO 170

```

```

DO 180 K=1,KMAX
  IF(MEM.NE.JCHART(1,K)) GO TO 160
  J=K
  GO TO 170
 180 CONTINUE

```

C 170 CONTINUE  
C 455

READY 401  
READY 402  
READY 403  
READY 404  
READY 405  
READY 406  
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READY 408  
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READY 454  
READY 455  
READY 456



```

9006 FORMAT( /, 10X, 45HMEMBERS TO BE EXCLUDED FROM FLUTTER REDESIGN , 1142
 1      7HPROCESS,          READY 1143
 2      //, 10X, 10(4X, GHMEMBER),/)  READY 1144
9007 FORMAT( /, 10X, 43HMEMBERS FOR WHICH NON-OPTIMUM FACTORS HAVE , 1145
 1      14HBEEN SPECIFIED,          READY 1146
 2      //, 10X, 6(20H MEMBER FACTOR),/)  READY 1147
9008 FORMAT( 10X, 10I10)          READY 1148
9009 FORMAT(10X,6(I10,F10.3))    READY 1149
9010 FORMAT( //,10X,15, 38H MEMBERS ARE EXCLUDED FROM THE FLUTTER, 1150
 1      17H REDESIGN PROCESS)      READY 1151
9011 FORMAT( //, 10X, 43HNON-OPTIMUM FACTORS HAVE BEEN SPECIFIED FOR,15, 1152
 1      8H MEMBERS)              READY 1153
9012 FORMAT( /, 10X, 17HDESIGN ARRAY DATA //, 1154
 1      10X,5H MEMB,          READY 1155
 2      8X,5H NEWT,          READY 1156
 3      10X,5H OLDT,          READY 1157
 4      10X,5HINITT,         READY 1158
 5      10X,5H MINT,          READY 1159
 6      10X,5H MAXT,          READY 1160
 7      10X,5H WPUT,4X,5H MEMB,/)  READY 1161
9013 FORMAT(10X,15.6F15.4,17)    READY 1162
9014 FORMAT( /, 10X, 25HINITIAL MASS BALANCE DATA, 1163
 1      //,10X, 8H NUMBER,9X,6WEIGHT,3(5X,3HDDOF),/)  READY 1164
9015 FORMAT(10X,18.F15.4,31B,/)   READY 1165
9016 FORMAT( /, 10X, 27HTOTAL MASS BALANCE WEIGHT =, F15.4,)  READY 1166
9017 FORMAT( /, 10X, 25HCURRENT MASS BALANCE DATA,/)  READY 1167
9018 FORMAT(10X,49HTHE OLD MASS BALANCE DATA HAS BEEN SUPERSEDED BY , 1168
 1      9HTHIS DATA,/)          READY 1169
9019 FORMAT( /, 10X, 8H NUMBER, 15H INITIAL Wght, 1170
 1      20H CURRENT Wght,3(5X,3HDDOF),/)  READY 1171
9020 FORMAT(10X,18.F15.4,F20.4,31B,/)   READY 1172
9021 FORMAT( /, 10X, 34H*****WEIGHT SUMMARY******/)  READY 1173
9022 FORMAT( /, 10X, 42HINITIAL REFERENCE WEIGHT .....,F12.4, 1174
 1      //,10X, 42HWEIGHT CHANGE IN LAST PASS THROUGH SOP .....,F12.4,  READY 1175
 2      //,10X, 42HCUMULATIVE STRUCT. WEIGHT CHANGE .....,F12.4,  READY 1176
 3      //,10X, 42HCUMULATIVE MASS BAL. WEIGHT CHANGE .....,F12.4,  READY 1177
 4      //,10X, 42HCUMULATIVE TOTAL WEIGHT CHANGE .....,F12.4,  READY 1178
 5      //,10X, 42HPERCENTAGE WEIGHT CHANGE (CUMULATIVE) .....,F12.4,  READY 1179
 6      //,10X, 42HTOTAL NEW WEIGHT .....,F12.4,  READY 1180
 7      /)                      READY 1181
9023 FORMAT(10X, 6HMEMBER,15, 33H APPEARS REDUNDANTLY IN THE DATA , 1182
 1      45HBLOCK ASSOCIATED WITH NON-OPT FACTORS AND/OR ,  READY 1183
 2      32HEXCLUSION FROM FLUTTER REDESIGN,          READY 1184
 3      /, 10X, 43HTHE INITIAL DATA IS BEING ACCEPTED AND THE ,  READY 1185
 4      49HREDUNDANT DATA IS BEING IGNORED. CHECK THE INPUT .  READY 1186
 5      SHDATA,/)                READY 1187
9024 FORMAT(10X,47HTHE FOLLOWING MEMBERS APPEAR IN THE DATA BLOCK , 1188
 1      49HASOCIATED WITH NON-OPT FACTORS AND/OR EXCLUSION .  READY 1189
 2      22HFROM FLUTTER REDESIGN,          READY 1190
 3      /, 10X, 49HHHOWEVER, THERE ARE NO SUCH MEMBER NUMBERS IN THE ,  READY 1191
 4      9HSTRUCTURE,/)                READY 1192
9025 FORMAT(10X,49HEXECUTION TERMINATES DUE TO ERRORS IN DATA BLOCK , 1193
 1      50HFOR NON-OPT FACTORS AND/OR EXCLUSION FROM FLUTTER .  READY 1194
 2      9HREDESIGN,          READY 1195
 3      /, 10X, 17HCHECK INPUT DATA ../)  READY 1196
9026 FORMAT( 3(8X,1PE15.5,1X))    READY 1197
9027 FORMAT( 1H1 QY RHFANMIC, 13 34 Y 12 11QR

```

```

C CALL PROGNA(4H(REA,4HDY ))
C ADJUST SCRATCH FILES ON UNITS CONTAINING B AND BT.
C CALL UNFIL(1)
C CALL PROGNA(4H(REA,4HDY ))
C 750 CONTINUE
C **** END OF CODE THAT HAS BEEN COMMENTED OUT. ****
C CALL THE MASS SUBROUTINE TO OBTAIN THE DYNAMIC MASS MATRIX MD.
C 760 CONTINUE
C CALL DYNMAS(WORK,KORE,BUFFER,IERR,IDIYFLX,IMASS,ITRNSF)
C CALL PROGNA(4H(REA,4HDY ))
C **** THE FOLLOWING LINES OF FASTOP CODE HAVE
C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT
C * USED IN THE CURRENT VERSION OF ESP. ****
C IF KLUB=1 READJUST SCRATCH FILE ON UNIT CONTAINING BT.
C IF(KLUB.EQ.0) GO TO 770
C CALL UNFIL(2)
C CALL PROGNA(4H(REA,4HDY ))
C 770 CONTINUE
C **** END OF CODE THAT HAS BEEN COMMENTED OUT. ****
C SET UNITS AND FILES FOR VIBRATION OUTPUT.
C CALL UNFIL(25)
C CALL PROGNA(4H(REA,4HDY ))
C CALL TIMEB(10,1CHFROM READY)
C CALL MESSAGE(2.5,SHREADY)
C
C 9000 FORMAT(4I15)
C 9002 FORMAT(4(2I5,F10.3))
C 9003 FORMAT(15,F15.5,315)
C 9004 FORMAT(/,10X,44HSTRESS RATIOS OF ACTIVE STRUCTURAL ELEMENTS
C 1 6HIN SDFP,
C 2 /,10X,5(20H MEMB STRESS RATIO,4X),/)
C 9005 FORMAT(10X,5(15,F15.5,4X),/)

1085
1090
1095
1100
1105
1110
1115
1120
1125
1130
1135
1140

```

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```

      C IF (KLUSE LE.0) GO TO 760
      C DO 680 I=1,NUMSTR
      C   WRITE(IUPR,9051) IDSTR(I), (IDYDFF(I,K),K=1,6)
      C   WRITE(IUPR,9052)
      C   DSTW=STRWN(1)-STRWI(1)
      C   DSTIX=STRIN(1,1)-STRII(1,1)
      C   DSTIY=STRIN(1,2)-STRII(1,2)
      C   DSTIZ=STRIN(1,3)-STRII(1,3)
      1030  DSTRX = STRRN(1,1) - STRRI(1,1)
      DSTRY = STRRN(1,2) - STRRI(1,2)
      DSTRZ = STRRN(1,3) - STRRI(1,3)
      DSTRFX = STRFN(1,1) - STRFI(1,1)
      DSTRFY = STRFN(1,2) - STRFI(1,2)
      DSTRFZ = STRFN(1,3) - STRFI(1,3)
      DSTRFXX = STRFN(1,4) - STRFI(1,4)
      DSTRFYX = STRFN(1,5) - STRFI(1,5)
      DSTRFZZ = STRFN(1,6) - STRFI(1,6)
      C   WRITE(IUPR,9053) STRWI(I),STRWN(I),DSTW,
      C   STRII(I,1),STRIN(I,1),DSTIX,
      C   STRII(I,2),STRIN(I,2),DSTIY,
      C   STRII(I,3),STRIN(I,3),DSTIZ,
      C   STRRI(I,1),STRRN(I,1),DSTRX,
      C   STRRI(I,2),STRRN(I,2),DSTRY,
      C   STRRI(I,3),STRRN(I,3),DSTRZ
      1040  1
      C   STRFI(I,1),STRFN(I,1),DSTFX
      C   STRFI(I,2),STRFN(I,2),DSTFY
      C   STRFI(I,3),STRFN(I,3),DSTFZ
      C   STRFI(I,4),STRFN(I,4),DSTFXX
      C   STRFI(I,5),STRFN(I,5),DSTFYX
      C   STRFI(I,6),STRFN(I,6),DSTFZZ
      1045  2
      C   680 CONTINUE
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      1050  1055
      C   READ DSM FROM UNIT IUA AND REPLACE MAIN DIAGONAL
      C   TERMS OF STORE-ON-STORE PARTITION WITH NEW VALUES.
      C   701 CONTINUE
      C   CALL UPDATE( IUA, IUPR, NCYC )
      C   ***** THE FOLLOWING LINES OF FASTOP CODE HAVE ****
      C   * BEEN COMMENTED OUT BECAUSE THEY ARE NOT ****
      C   * USED IN THE CURRENT VERSION OF ESP. ****
      C   ***** ***** ***** ***** ***** ***** ***** *****
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      C   6885
      C
```

SUBROUTINE READY 74/74 OPT:1  
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```

 970      C 530 CONTINUE
          C WMB=0.0
          C DO 540 I=1 NMBAL
          C 540 WMB=VMB+VMBNEW(I)
          C
 975      C 600 CONTINUE
          C
          C IF (KLUBAL.EQ.0) GO TO 640
          C
          C KOUNT=LINES
          C CALL TITLES(2)
          C WRITE(IUPR,9017)
          C KOUNT=KOUNT+3
          C IF (MORBAL.EQ.0) GO TO 610
          C
          C WRITE(IUPR,9018)
          C KOUNT=KOUNT+3
          C
 980      C 610 CONTINUE
          C WRITE(IUPR,9019)
          C KOUNT=KOUNT+3
          C
 985      C DO 620 I=1,NMBAL
          C WRITE(IUPR,9020) IDBAL(I),VMBIN(I),VMBNEW(I),J=1,3)
          C KOUNT=KOUNT+2
          C
 990      C 620 CONTINUE
          C
          C 640 CONTINUE
          C
 995      C WBOTW=WMB+WST
          C WPRES=WINITT+WBOTH
          C WPCT=100.*(WBOTH/WINITT)
          C
 1000     C KOUNT=LINES
          C CALL TITLES(2)
          C WRITE(IUPR,9021)
          C KOUNT=KOUNT+3
          C WRITE(IUPR,9022) WINITT,WCHNGE,WST,WMB,WBOTW,WPCT,WPRES
          C KOUNT=KOUNT+15
          C
 1005     C
          C
          C COMMON /STORES/ CONTAINS 277 WORDS
          C COMMON /STRCLU/ CONTAINS 10 WORDS
          C CALL GEDLAB(8READY,50,IUSTRI,NAME,IFSTRI,MROW,MCOL)
          C NBYTE= 4*277
          C CALL DREAD(IUSTRI,MSTOR(1),NBYTE)
          C NBYTE= 4*10
          C CALL DREAD(IUSTRI,KSTOR(1),NBYTE)
          C CALL DCLOSE(IUSTRI)
          C
 1010     C KOUNT=LINES
          C CALL TITLES(2)
          C
 1015     C
          C
 1020     C
          C **** END OF CODE THAT HAS BEEN COMMENTED OUT ****
          C
 1025     C 700 CONTINUE
          C
 1026     C
          C **** END ****
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 2179     C
 2180     C
 2181     C
 2182     C
 2183     C
 2184     C
 2185     C
 2186     C
 2187     C
 2188     C
 2189     C
 2190     C
 2191     C
 2192     C
 2193     C
 2194     C
 2195     C
 2196     C
 2197     C
 2198     C
 2199     C
 2200     C
 2201     C
 2202     C
 2203     C
 2204     C
 2205     C
 2206     C
 2207     C
 2208     C
 2209     C
 2210     C
 2211     C
 2212     C
 2213     C
 2214     C
 2215     C
 2216     C
 2217     C
 2218     C
 2219     C
 2220     C
 2221     C
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 2223     C
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 2225     C
 2226     C
 2227     C
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 2229     C
 2230     C
 2231     C
 2232     C
 2233     C
 2234     C
 2235     C
 2236     C
 2237     C
 2238     C
 2239     C
 2240     C
 2241     C
 2242     C
 2243     C
 2244     C
 2245     C
 2246     C
 2247     C
 2248     C
 2249     C
 2250     C
 2251     C
 2252     C
 2253     C
 2254     C
 2255     C
 2256     C
 2257     C
 2258     C
 2259     C
 2260     C
 2261     C
 2262     C
 2263     C
 2264     C
 2265     C
 2266     C
 2267     C
 2268     C
 2269     C
 2270     C
 2271     C
 2272     C
 2273     C
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 2276     C
 2277     C
 2278     C
 2279     C
 2280     C
 2281     C
 2282     C
 2283     C
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 2289     C
 2290     C
 2291     C
 2292     C
 2293     C
 2294     C
 2295     C
 2296     C
 2297     C
 2298     C
 2299     C
 2300     C
 2301     C
 2302     C
 2303     C
 2304     C
 2305     C
 2306     C
 2307     C
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 2309     C
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 2330     C
 2331     C
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 2333     C
 2334     C
 2335     C
 2336     C
 2337     C
 2338     C
 2339     C
 2340     C
 2341     C
 2342     C
 2343     C
 2344     C
 2345     C
 2346     C
 2
```

SUBROUTINE READY 74/74 OPT=1 FTN 4.8+577 85/01/23. OB. 10.44 PAGE 17  
 C IF(SRMIN.LE.SZMIN) ROE(JMINT)=-SZMIN  
 C 440 CONTINUE  
 C CALL TITLES(2)  
 C IF(KOUNT.GT.KOUNTH) GO TO 442  
 C WRITE(IUPR,9012)  
 C KOUNT=KOUNT+5  
 C L=0  
 C 442 CONTINUE  
 C AMINT=ABS(ROE(JMINT))  
 C WRITE(IUPR,9013) IROE,ROE(JNEWT),ROE(JOLDT),ROE(JINITT),  
 C 1 AMINT,ROE(JMAXT),ROE(JPUT).TROE  
 C KOUNT=KOUNT+1  
 C L=L+1  
 C IF(L.LT.4) GO TO 443  
 C L=0  
 C IF(KOUNT.EQ.LINES) GO TO 443  
 C CALL PLB(1,1,IUPR)  
 C KOUNT=KOUNT+1  
 C 443 CONTINUE  
 C CALL PUTROW(IUDESN,2,ROE,KCOL)  
 C LYNE=LYNE+1  
 C GO TO 460  
 C JUMP=1  
 C 460 CONTINUE  
 C CALL DCLOSE(IUDESI)  
 C CALL DCLOSE(IUDESN)  
 C CALL DCLOSE(IUMEMN)  
 C  
 C NMBAL=0  
 C WMB=0.0  
 C IF(KLUBAL.EQ.0) GO TO 480  
 C CALL GEDLAB(8HREADY 11.IUBLI,NAME,IFBALI,MROW,MCOL)  
 C COMMON/BAL/ CONTAINS 241 WORDS  
 C  
 C NBYTE=4\*24<sup>1</sup>  
 C CALL DREAD(IUBLI,MB(1),NBYTE)  
 C CALL DCLOSE(IUBLI)  
 C  
 C DO 470 I=1,NMBAL  
 C 470 WMB=WMB+VMBNEW(I)  
 C  
 C 480 CONTINUE  
 C  
 C WCHNGE=(WST+WMB)-WBOTH  
 C IF(KLUBAL.EQ.0.OR.MORBAL.EQ.0) GO TO 600  
 C  
 C 500 READ(IUCD 9003) I1,A1  
 C IF(I1.EQ.0) GO TO 530  
 C DO 520 I=1,NMBAL  
 C IF(I1.EQ.IDBAL(I)) VMBNEW(I)=A1  
 C 520 CONTINUE  
 C  
 C GO TO 500  
 C

SUBROUTINE READY 74/74 OPT=1

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C CALL PREAD(IUSTF0,PATTY(1),24) 857  
C CALL PRITE(IUSTFN,PATTY(1),24) 858  
C NBYTE=4\*NODES 859  
C CALL PREAC(IUSTF0,NSTART(1),NBYTE) 860  
C CALL PRITE(IUSTFN,NSTART(1),NBYTE) 861  
C CALL PREAD(IUSTF0,NGO(1),NBYTE) 862  
C CALL PRITE(IUSTFN,NGO(1),NBYTE) 863  
C NBYTE=NBYTES\*IROW 864  
DO 410 J=1,ICOL 865  
C CALL PREAD(IUSTF0,ELSTF(1,J),NBYTE) 866  
C CALL REND(IUSTF0) 867  
C CALL WEND(IUSTFN) 868  
C 410 CALL PRITE(IUSTFN,ELSTF(1,J),NBYTE) 869  
C CALL REND(IUSTF0) 870  
C CALL WEND(IUSTFN) 871  
C 420 CONTINUE 872  
C CALL DCLOSE(IUSTF0) 873  
C CALL DCLOSE(IUSTFN) 874  
C 430 CONTINUE 875  
C IPOS(IUWTI)=IFWTI 876  
C CALL GEDLAB(8HREADY 08,IUWTI,NAME,IFWTI,KROW,KCOL) 877  
C NBYTE=4\*6 878  
C CALL DREAD(IUWTI,WINITT,NBYTE) 879  
C CALL DCLOSE(IUWTI) 880  
C IPOS(IUDESI)=IFDESI 881  
C IPOS(IUDESN)=IFDESN 882  
C IPOS(IUMEMN)=IFMEMN 883  
C CALL GEDLAB(8HREADY 09,IUDESI,NAME,IFDESI,KROW,KCOL) 884  
C CALL PUDLAB(8HREADY 05,IUDESN,NAME,IFDESN,KROW,KCOL) 885  
C NDESYS=KROW 886  
C CALL GEDLAB(8HREADY 10,IUMEMN,NAME,IFMEMN,LROW,LCOL) 887  
C KOUNT=LINES 888  
C LYN=0 889  
C WST=0.0 890  
C JUMP=0 891  
DO 460 I=1,LROW 892  
C CALL GETROW(IUMEMN,1,BUFFER,LCOL) 893  
C WST=WST+(BUFFER(IINPUT)\*(BUFFER(IT)-BUFFER(IINITT))) 894  
C IF(LYNF.EQ.0) KROW GO TO 460 895  
C IF(JUMP.EQ.1) GO TO 435 896  
C CALL GETROW(IUDESI,1,ROE,KCOL) 897  
C ROE(JOLDT)=ROE(JNEWT) 898  
C 435 CONTINUE 899  
C IF(LBUF.NE.IROE) GO TO 445 900  
C JUMP=0 901  
C ROE(JNEWT)=BUFFER(IT) 902  
C IF(KLUNAL.EQ.0) GO TO 440 903  
C SRMIN=BUFFER(ISRAT)BUFFER(IT) 904  
C SZMIN=BUFFER(IMINT) 905  
C IF(SRMIN.GT.SZMIN) ROE(JMINT)=SRMIN 906  
C 907  
C 908  
C 909  
C 910  
C 911  
C 912  
C 913

ROUTINE	REAL	74/74	OPT=1	FTN 4.8+577	55/01/23. 08.10.44
800					
	9 .STRFI(1,3).STRFN(1,3).DSTFZ A .STRFI(1,4).STRFN(1,4).DSTFX B .STRFI(1,5).STRFN(1,5).DSTFY C .STRFI(1,6).STRFN(1,6).DSTFZ				
	398 CONTINUE				
805	9051 FORMAT(/10X,7HNUMBER=,15//10X,13HYNAMIC DOF = ,6I5//) 9052 FORMAT(10X,10X,15HINITIAL VALUE ,5X, 1 15HCURRENT VALUE ,5X, 2 15HDELTA VALUE ,/)				
810	9053 FORMAT(10X,10H WEIGHT...3(E15.5,5X), 1 /,10X,10H IXX ...3(E15.5,5X), 2 /,10X,10H IYY ...3(E15.5,5X), 3 /,10X,10H IZZ ...3(E15.5,5X), 4 /,10X,10H RX ...3(E15.5,5X), 5 /,10X,10H RY ...3(E15.5,5X), 6 /,10X,10H RZ ...3(E15.5,5X), 7 /,10X,10H PFX ...3(E15.5,5X), 8 /,10X,10H PFY ...3(E15.5,5X), 9 /,10X,10H PFZ ...3(E15.5,5X), A /,10X,10H PFXX ...3(E15.5,5X), B /,10X,10H PFYY ...3(E15.5,5X), C /,10X,10H PFZZ ...3(E15.5,5X),//)				
820	C CALL INCONS GO TO 701				
825	C 400 CONTINUE				
830	C **** C * THE FOLLOWING LINES OF FASTOP CODE HAVE C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT C * USED IN THE CURRENT VERSION OF ESP. C ****				
835	C IF(NCYC.GT.0) GO TO 700  C NPASS=1 DO SOME OR ALL OF THE FOLLOWING-DEPENDING ON THE CURRENT C USE OF THE PROGRAM AND THE MANNER IN WHICH ASOP WAS USED IN THE LAST C PASS THROUGH THE ANALYSIS PACKAGE.				
840	C 1. TRANSFER THE ELEMENT STIFFNESS FILE TO AN OUTPUT UNIT. C 2. UPDATE THE DESIGN ARRAY TO REFLECT MODIFICATIONS MADE BY ASOP. C 3. TRANSFER WEIGHT DATA AND MASS BALANCE DATA FROM INPUT TAPE TO CORE.				
845	C IF(KLUSE.NE.2) GO TO 430  C IUSTFN=IUDUM3-IUSTFN IUSTFO=IUDUM3-IUSTFO IFSTFN=IFDUM3-IFSTFN IFSTFO=IFDUM3-IFSTFO				
850	C CALL GEDLAB(8HREADY 07,IUSTFO,NAME,IFSTFO,MROW,MCOL) CALL PUDLAB(8HREADY 04,IUSTFN,NAME,IFSTFN,MROW,MCOL)				

SUBROUTINE READY 74/74 OPT=1

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C   IUA = 14          READY 743
CIBM          READY 744
C          IUA = 11          READY 745
CCDC          IUA = 11          READY 746
CCDC          IUA = 11          READY 747
C          IFA = 1          READY 748
IF(ISTEP.LT.0) ISTEP=1          READY 749
IF(ISTEP.GT.1) ISTEP=0          READY 750
TESTO = 0          READY 751
ISTOP = 0          READY 752
IPAR = 0          READY 753
IDUB = ISTEP          READY 754
ITAPEN = ITAPES(40)          READY 755
ISAVE = ITAPEW          READY 756
ITAPEN = ITAPEN          READY 757
CALL TITLES(1)          READY 758
ITAPEW = ISAVE          READY 759
READ(IUCD,9055) VNEW,STPOLD,VS          READY 760
VNSAVE = VNEW          READY 761
FORMAT(3E10.3)          READY 762
READ(IUCD,9055) STEP1,STEP2,ASTEP          READY 763
SAVSTP = STEP2          READY 764
RILSTP = ASTEP          READY 765
ASTEP = 10.0 * RILSTP          READY 766
NUMSTR=1          READY 767
C          COUNT=LINES          READY 768
CALL TITLES(2)          READY 769
C          DO 398 I=1,NUMSTR          READY 770
WRITE(IUPR,9051) IDSTR(I),(IDYD0F(I,K),K=1,6)          READY 771
WRITE(IUPR,9052)          READY 772
DSTW=STRW(I)-STRW(I)          READY 773
DSTIX=STRIN(I,1)-STRII(I,1)          READY 774
DSTIV=STRIN(I,2)-STRII(I,2)          READY 775
DSTIZ=STRIN(I,3)-STRII(I,3)          READY 776
DSTRX = STRRN(I,1) - STRRI(I,1)          READY 777
DSTRY = STRRN(I,2) - STRRI(I,2)          READY 778
DSTRZ = STRRN(I,3) - STRRI(I,3)          READY 779
DSTFX = STRFN(I,1) - STRFI(I,1)          READY 780
DSTFY = STRFN(I,2) - STRFI(I,2)          READY 781
DSTFZ = STRFN(I,3) - STRFI(I,3)          READY 782
DSTFXX = STRFN(I,4) - STRFI(I,4)          READY 783
DSTFYY = STRFN(I,5) - STRFI(I,5)          READY 784
DSTFZZ = STRFN(I,6) - STRFI(I,6)          READY 785
WRITE(IUPR,9053) STRWI(I),STRWN(I),DSTW,          READY 786
1          STRII(I,1),STRIN(I,1),DSTIX,          READY 787
2          STRII(I,2),STRIN(I,2),DSTIV,          READY 788
3          STRII(I,3),STRIN(I,3),DSTIZ,          READY 789
4          STRRI(I,1),STRRN(I,1),DSTRX,          READY 790
5          STRRI(I,2),STRRN(I,2),DSTRY,          READY 791
6          STRRI(I,3),STRRN(I,3),DSTRZ          READY 792
7          STRFI(I,1),STRFN(I,1),DSIFX          READY 793
8          STRFI(I,2),STRFN(I,2),DSIFY          READY 794
9          STRFN(I,3),STRFN(I,3),DSIFV          READY 795
          STRFN(I,4),STRFN(I,4),DSIFV          READY 796
          STRFN(I,5),STRFN(I,5),DSIFV          READY 797
          STRFN(I,6),STRFN(I,6),DSIFV          READY 798
          STRFN(I,7),STRFN(I,7),DSIFV          READY 799

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SUBROUTINE	READY	74/74	OPT=1	FTN 4.8+577	85/01/23	08.10.44	PAGE	13
685		9054	FORMAT(E15.5./,3E15.5./,3E15.5./,6E10.3)				READY	686
	SCALE(N,1) = E						READY	687
	DO 386 NN= 1,3						READY	688
	SCALE(N,NN+1)= F(NN)						READY	689
	SCALE(N,NN+4)= G(NN)						READY	690
690	386 CONTINUE						READY	691
	9056 FORMAT(3E15.5)						READY	692
	9050 FORMAT(E15.5./,3E15.5./,3E15.5./,6E10.3./,6E15./,6E15.)						READY	693
	DO 387 NN = 1, 6						READY	694
	SCALE(N,NN+7) = T(NN)						READY	695
695	387 CONTINUE						READY	696
	I=I+1						READY	697
	IDSTR(I)=N						READY	698
	STRWI(I)=A						READY	699
	STRW0(I)=A						READY	700
700	STRWN(1)=A						READY	701
	STRRDO(I)=O,O						READY	702
	STRWDN(I)=O,O						READY	703
	C DO 391 K=1,3						READY	704
	STRII(I,K)=B(K)						READY	705
	STRIO(I,K)=B(K)						READY	706
	STRIN(I,K)=B(K)						READY	707
	STRIDO(I,K)=O,O						READY	708
	STRDN(I,K)=O,O						READY	709
	STRRI(I,K)= C(K)						READY	710
	STRRO(I,K)= C(K)						READY	711
	STRRN(I,K)= C(K)						READY	712
	STRRDO(I,K)= O,						READY	713
	STRRDN(I,K)= O.						READY	714
705	391 CONTINUE						READY	715
	C DO 392 K=1,6						READY	716
	ISTDOF(I,K)=IJS(K)						READY	717
	IDYDF(I,K)=IJD(K)						READY	718
	STRFI(I,K)= S(K)						READY	719
	STRFO(I,K)= S(K)						READY	720
	STREN(I,K)= S(K)						READY	721
	STRFDO(I,K)= O,O						READY	722
	STRFDN(I,K)= O,O						READY	723
710	392 CONTINUE						READY	724
	GO TO 390						READY	725
	395 CONTINUE						READY	726
	READ(IUCD,9000) ISTEP,KCONST,ISIZE						READY	727
730	C TRANSFER DYNAMIC FLEXIBILITY MATRIX( DSM ) TO DSIO						READY	728
	C UNIT 14. INVERT DSM AND PLACE ON FILE 2 OF UNIT 8.						READY	729
	CIBM CALL DINIT(14,8HFT14F001)						READY	730
	CIBM CALL DINIT(15,8HFT15F001)						READY	731
	C CALL DYNSTF						READY	732
	CIBM						READY	733
	C CALL DYNSTF						READY	734
	CIBM						READY	735
735	C CALL DINIT(14,8HFT14F001)						READY	736
	CIBM CALL DINIT(15,8HFT15F001)						READY	737
	C CALL DYNSTF						READY	738
	CIBM						READY	739
	C CALL DYNSTF						READY	740
740	C CIBM						READY	741
	CIBM						READY	742

```

C **** THE FOLLOWING LINES OF FASTOP CODE HAVE *
C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT *
C * USED IN THE CURRENT VERSION OF ESP. *
C ****
C IF(KLUBAL.EQ.0) GO TO 385
C I=0
C 365 READ(IUCD,9003) I,A1 (J1(K),K=1,3)
C IF(I,EQ.0) GO TO 375
C I=I+1
C IDBAL(I)=I1
C VMBLN(I)=A1
C VMBOLD(I)=A1
C VMBNEW(I)=A1
C DO 370 K=1,3
C 370 MBDOF(I,K)=J1(K)
C ORVMB(1)=0.0
C ORVMB(1)=0.0
C S1MB(1)=0.0
C S2MB(1)=0.0
C S3MB(1)=0.0
C GO TO 365
C 375 NMBAL*I
C
C KOUNT=LINES
C CALL TITLES(2)
C WRITE(IUPR,9014)
C KOUNT=KOUNT+5
C DO 380 LL=1,NMBAL
C WMB=WMB+VMBNEW(LL)
C WRITE(IUPR,9015) IDBAL(LL),VMBIN(LL),(MBDOF(LL,MM),MM=1,3)
C KOUNT=KOUNT+2
C 380 CONTINUE
C WRITE(IUPR,9016) WMB
C KOUNT=KOUNT+2
C 385 CONTINUE
C **** END OF CODE THAT HAS BEEN COMMENTED OUT. *
C ****
C WBOTH=WMB+WST
C IF (KLUSE.LE.0) GO TO 400
C NUMSTR=0
C I=0
C 390 CONTINUE
READ(IUCD,9000) N
IF(N.EQ.0) GO TO 395
IFLEX = 29
IPREV = 0
READ(IUCD,9050) A, B, C, S, IJS, IUD

```

READY 629  
READY 630  
READY 631  
READY 632  
READY 633  
READY 634  
READY 635  
READY 636  
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READY 679  
READY 680  
READY 681  
READY 682  
READY 683  
READY 684  
READY 685

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572      READY   573
C       IROE=IBUF          READY   574
C       ROE(JWPUT)=WT        READY   575
C       ROE(JINITT)=BUFFER(IT)  READY   576
C       SRMIN=BUFFER(IUMINT)    READY   577
C       SZMIN=BUFFER(IUMINT)    READY   578
C       IF(SRMIN.GT.SZMIN) ROE(JMINT)=SRMIN
C       IF(SRMIN.LE.SZMIN) ROE(JMINT)=-SZMIN
C       ROE(JMAXT)=BUFFER(IMAXT)
C       ROE(JOLDT)=O.O
C       ROE(JNEWT)=BUFFER(IT)
C       ROE(JDRV)=O.O
C       ROE(JDRV0)=O.O
C       ROE(JSPR1)=O.O
C       ROE(JSPR2)=O.O
C       ROE(JSPR3)=O.O
C       CALL PUTROW(IUDESN,2,ROE,NVAR)
C
C       CALL TITLES(2)
C       IF(KOUNT.GT.KOUNTH) GO TO 310
C       WRITE(IUPR,9012)
C       KOUNT=KOUNT+5
C       L=O
C
C       310 CONTINUE
C       AMINT=ABS(ROE(JMINT))
C       WRITE(IUPR,9013) IROE,ROE(JNEWT),ROE(JOLDT),ROE(JINITT),
C       AMINT,ROE(JMAXT),ROE(JWPUT),IROE
C
C       KOUNT=KOUNT+1
C       L=L+1
C       IF(L.LT.4) GO TO 320
C       L=O
C       IF(KOUNT.EQ.LINES) GO TO 320
C       CALL PLB(1,1,IUPR)
C       KOUNT=KOUNT+1
C
C       320 CONTINUE
C       CALL PUTROW(IUMEMN,1,BUFFER,KCOL)
C
C       350 CONTINUE
C
C       610
C
C       CALL DCLOSE(IUMEMO)
C       CALL DCLOSE(IUMEMN)
C
C       CALL DCLOSE(IUDESN)
C       CALL DCLOSE(IUTSFN)
C
C       **** END OF CODE THAT HAS BEEN COMMENTED OUT. ****
C
C       615
C
C       620
C       360 CONTINUE
C
C       WST=O.O
C       WMB=O.O
C
C       625

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SUBROUTINE READY 74/74 OPT=1

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```
      IPOS(IUMEMO)=IFMEMO
      IPOS(IUMEMN)=IFMENN
      C **** THE FOLLOWING LINE OF FASTOP CODE HAS ****
      C * BEEN COMMENTED OUT BECAUSE IT IS NOT *
      C * USED IN THE CURRENT VERSION OF ESP. *
      C **** CALL GEDLAB(BHREADY 06,IUMEMO,NAME,IFMEMO,KROW,KCOL)
      C **** THE FOLLOWING TWO LINES OF FASTOP CODE *
      C * HAVE BEEN MODIFIED FOR THE CURRENT *
      C * VERSION OF ESP. *
      C **** CALL PUDLAB(BHREADY 02,IUMEMN,NAME,IFMENN,KROW,KCOL)
      C NDESYS=NSTIMEM-NDESNO
      C CALL PUDLAB (BHREADY 02,IUMEMN,NAME,IFMENN,O,KCOL )
      C NDESYS = O
      C CALL PUDLAB(BHREADY 03,IUDESN,NAM1,IFDESN,NDESYS,NVAR)
      C CALL DCLOSE (IUMEMN)
      C CALL DCLOSE (IUDESN)
      C **** THE FOLLOWING LINES OF FASTOP CODE HAVE ****
      C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT *
      C * USED IN THE CURRENT VERSION OF ESP. *
      C **** COUNT=LINES
      C DO 350 I=1,KROW
      C CALL GETROW(IUMEMO,1,BUFFER,KCOL)
      C BUFFER(1MINTO)=BUFFER(1MINT)
      C BUFFER(1INITT)=BUFFER(1IT)
      C BUFFER(1INPUT)=WIT
      C IF(IDNOPT.NE.1) GO TO 300
      C IF(I GT KMAX) GO TO 240
      C IF(IBUF.NE.JCHART(1,1)) GO TO 240
      C J=I
      C GO TO 260
      C 240 CONTINUE
      C DO 250 K=1,KMAX
      C IF(IBUF.NE.JCHART(1,K)) GO TO 250
      C J=K
      C GO TO 260
      C 250 CONTINUE
      C GO TO 300
      C 260 CONTINUE
      C IF(JCHART(2,J) EQ 1) GO TO 320
      C 300 CONTINUE
      C 578
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C 300 CONTINUE





SUBROUTINE	READY	74/74	OPT=1	RELOCATION
VARIABLES	SN	TYPE		PLACES
135 IFPH		INTEGER		PLACES
127 IFPHT		INTEGER		PLACES
121 IFPHIF		INTEGER		PLACES
133 IFQ		INTEGER		PLACES
131 IFQT		INTEGER		PLACES
11 IFSCR		INTEGER		PLACES
27 IFSTFN		INTEGER		PLACES
63 IFSTFO		INTEGER		PLACES
1 IFSTR1		INTEGER		LOCSTR
12 IFS1		INTEGER		PLACES
13 IFS2		INTEGER		PLACES
14 IFS3		INTEGER		PLACES
15 IFS4		INTEGER		PLACES
75 IFWT		INTEGER		PLACES
47 IFWT1		INTEGER		PLACES
23 IFY		INTEGER		PLACES
107 IFYT		INTEGER		PLACES
111 IFZ		INTEGER		PLACES
113 IFZR		INTEGER		PLACES
10 LINITT		INTEGER		COLS
71416 IUD		INTEGER	ARRAY	REFS
71410 IUS		INTEGER	ARRAY	REFS
2015 IMASS		INTEGER		REFS
2 IMAXT		INTEGER		REFS
1 IMINT		INTEGER		COLS
7 IMINTO		INTEGER		COLS
0 INVERT		INTEGER		INVERT
4 IOLDT		INTEGER		COLS
5 IOLDW		INTEGER		COLS
1 IPAR		INTEGER		ACCEL
41 IPERM		INTEGER	ARRAY	REFS
0 IPOS		INTEGER	ARRAY	REFS
173 IPREV		INTEGER		REFS
2 IRD		INTEGER		REFS
2052 IROE		INTEGER		REFS
2030 ISAVE		INTEGER		REFS
0 ISIZE		INTEGER		RESIZE
6 ISRAT		INTEGER		COLS
2 ISTDOF		INTEGER		STORES
1 ISTEP		INTEGER		STRCLU
		*UNDEF		
0 ISTOP		INTEGER	ACCEL	REFS
0 IT		INTEGER	COLS	REFS
2027 ITAPEN		INTEGER		COMRWP
2 ITAPEP		INTEGER		REFS
0 ITAPER		INTEGER		REFS
0 ITAPES		INTEGER	ARRAY	CTAPES
1 ITAPEW		INTEGER		COMRWP
51 ITESTO		INTEGER		RESIZE
2016 ITRNSF		INTEGER		PLACES
20 IUAA		INTEGER		PLACES
66 IUADD		INTEGER		PLACES
40 IUADDI		INTEGER		INVERT
1 IUAA2		INTEGER		PLACES
32 IUB		INTEGER		PLACES
70 IUBAL		INTEGER		PLACES
42 IUBAL1		INTEGER		REFS

SUBROUTINE	READY	74/74	OPT=1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	25
VARIABLES	SN	TYPE	RELOCATION	REFS	53	I/O REFS	216	680
116	IUBR	INTEGER	PLACES	REFS	53			684
52	IUBT	INTEGER	PLACES	REFS	53			685
16	IUCD	INTEGER	PLACES	REFS	764			729
72	IUDESF	INTEGER	PLACES	REFS	53			
44	IUDESI	INTEGER	PLACES	REFS	53			
51	IUDESN	INTEGER	PLACES	REFS	53			
34	IUDESO	INTEGER	PLACES	REFS	53			
76	IUDUM1	INTEGER	PLACES	REFS	53			
76	IUDUM2	INTEGER	PLACES	REFS	53			
100	IUDUM3	INTEGER	PLACES	REFS	53			
102	IUDUM4	INTEGER	PLACES	REFS	53			
4	IUGO1	INTEGER	PLACES	REFS	53			
5	IUGO2	INTEGER	PLACES	REFS	53			
6	IUGO3	INTEGER	PLACES	REFS	53			
7	IUGO4	INTEGER	PLACES	REFS	53			
140	IUINCK	INTEGER	PLACES	REFS	53			
136	IUINCM	INTEGER	PLACES	REFS	53			
0	IUIN1	INTEGER	PLACES	REFS	53			
1	IUIN2	INTEGER	PLACES	REFS	53			
30	IUKS	INTEGER	PLACES	REFS	53			
104	IUL	INTEGER	PLACES	REFS	53			
114	IULR	INTEGER	PLACES	REFS	53			
56	IUMD	INTEGER	PLACES	REFS	53			
64	IUMDB	INTEGER	PLACES	REFS	53			
36	IUMDB1	INTEGER	PLACES	REFS	53			
60	IUMEMF	INTEGER	PLACES	REFS	53			
24	IUMEMN	INTEGER	PLACES	REFS	53			
50	IUMEMO	INTEGER	PLACES	REFS	53			
4	IUMOD	INTEGER	LOCSTR	REFS	87			
124	IUMODK	INTEGER	PLACES	REFS	53			
122	IUMODM	INTEGER	PLACES	REFS	53			
2	IUMREF	INTEGER	LOCSTR	REFS	87			
2	IUOUT1	INTEGER	PLACES	REFS	53			
3	IUOUT2	INTEGER	PLACES	REFS	53			
134	IUPH	INTEGER	PLACES	REFS	53			
126	IUPHT	INTEGER	PLACES	REFS	53			
120	IUPHTF	INTEGER	PLACES	REFS	53			
17	IUPR	INTEGER	PLACES	REFS	53			
132	IUQ	INTEGER	PLACES	REFS	1045			
130	IUJI	INTEGER	PLACES	REFS	53			
10	IUSCR	INTEGER	PLACES	REFS	53			
26	IUSTFN	INTEGER	PLACES	REFS	53			
62	IUSTFO	INTEGER	PLACES	REFS	53			
0	IUSTRI	INTEGER	LOCSTR	REFS	87			
74	IWT	INTEGER	PLACES	REFS	53			
46	IWT1	INTEGER	PLACES	REFS	53			
22	IUY	INTEGER	PLACES	REFS	53			
106	IUYT	INTEGER	PLACES	REFS	53			
110	IUZ	INTEGER	PLACES	REFS	53			
112	IUZR	INTEGER	PLACES	REFS	53			
2557	IWORK	INTEGER	COLS	REFS	24			
11	INPUT	INTEGER	ARRAY	COLS	48	DEFINED	141	
2557	JCHART	INTEGER		COLS	12	24		
21	JDVR	INTEGER		COLS	48	DEFINED	150	
22	INTFCFR			COLS	48	DEFINED	151	

SUBROUTINE	READY	74/74	OPT=1	RELOCATION		
VARIABLES	SN	TYPE		COLS	REFS	
14 JINITT		INTEGER		COLS	48	DEFINED 145
16 JMEXT		INTEGER		COLS	48	DEFINED 147
15 JMINT		INTEGER		COLS	48	DEFINED 146
20 JNEWT		INTEGER		COLS	48	DEFINED 149
17 JOLDT		INTEGER		COLS	48	DEFINED 148
23 JSPR1		INTEGER		COLS	48	DEFINED 152
24 JSPR2		INTEGER		COLS	48	DEFINED 153
25 JSPR3		INTEGER		COLS	48	DEFINED 154
13 JPUT		INTEGER		COLS	48	DEFINED 144
71371 J1		INTEGER		*UNDEF	17	
2022 K		INTEGER		REFS	295	2*706
7 KBPAGE		INTEGER		REFS	2*711	2*707
2017 KCOL		INTEGER		REFS	2*722	2*719
1 KCONST		INTEGER		REFS	2*723	2*720
4 KLABEL		INTEGER		REFS	295	1030
24 KLUB		INTEGER		REFS	297	1030
4 KLUEV		INTEGER	ARRAY	STORES	295	1030
3 KLUMD		INTEGER		CLIST	295	1030
1 KLUNAL		INTEGER		CLIST	295	1030
25 KLUQ		INTEGER		CLIST	295	1030
0 KLUSE		INTEGER		CLIST	295	1030
0 KORE		INTEGER		CLIST	295	1030
1 KOREDP		INTEGER		CLIST	295	1030
0 KOUNT		INTEGER		CLIST	295	1030
11 KOUNTH		INTEGER		CLIST	295	1030
12 KOUNTI		INTEGER		CLIST	295	1030
1 KPAGE		INTEGER		CLIST	295	1030
0 KROW		INTEGER		CLIST	295	1030
2020 KSTOR		INTEGER	ARRAY	STRCLU	289	294
5 KTPAGE		INTEGER		CLIST	289	294
2 LINES		INTEGER		CLIST	289	294
10 LINESG		INTEGER		CLIST	289	294
3 LINEST		INTEGER		CLIST	289	294
0 LKLUEV		INTEGER		CLUEV	289	294
0 MB		INTEGER		BAL	289	294
121 MBDOF		INTEGER		BAL	289	294
26 MORBAL		INTEGER		KLUES	289	294
5 MSADD		INTEGER		KLUES	289	294
0 MSTAR		INTEGER		STORES	289	294
71317 MUMJ		INTEGER		*UNDEF	289	294
2 M1		INTEGER		STRCLU	289	294
3 M2		INTEGER		STRCLU	289	294
4 M3		INTEGER		STRCLU	289	294
5 M4		INTEGER		STRCLU	289	294
2023 N		INTEGER		REFS	681	687
71357 NAME		INTEGER	ARRAY	REFS	680	689
71440 NAMFLX		INTEGER	ARRAY	REFS	15	531
71361 NAM1		INTEGER	ARRAY	REFS	21	289
71363 NAM2		INTEGER	*UNDEF	REFS	15	533
71365 NAM3		INTEGER	*UNDEF	REFS	15	533
71367 NAM4		INTEGER	*UNDEF	RFFS	15	533

SUBROUTINE	READY	74/74	OPT=1	RELOCATION		FTN 4.8+577	85/01/23. 08.10.44	PAGE	26
VARIABLES	SN	TYPE		COLS	REFS				
14 JINITT		INTEGER		COLS	48	DEFINED	145		
16 JMEXT		INTEGER		COLS	48	DEFINED	147		
15 JMINT		INTEGER		COLS	48	DEFINED	146		
20 JNEWT		INTEGER		COLS	48	DEFINED	149		
17 JOLDT		INTEGER		COLS	48	DEFINED	148		
23 JSPR1		INTEGER		COLS	48	DEFINED	152		
24 JSPR2		INTEGER		COLS	48	DEFINED	153		
25 JSPR3		INTEGER		COLS	48	DEFINED	154		
13 JPUT		INTEGER		COLS	48	DEFINED	144		
71371 J1		INTEGER		REFS	17				
2022 K		INTEGER		REFS	2*711	2*707	710		
7 KBPAGE		INTEGER		REFS	2*722	2*719	710		
2017 KCOL		INTEGER		REFS	2*723	2*720	710		
1 KCONST		INTEGER		REFS	295	1030			
4 KLABEL		INTEGER		REFS	297	1030			
24 KLUB		INTEGER		REFS	77	531			
4 KLUEV		INTEGER	ARRAY	STORES	289	294			
3 KLUMD		INTEGER		CLIST	289	294			
1 KLUNAL		INTEGER		CLIST	289	294			
25 KLUQ		INTEGER		CLIST	289	294			
0 KLUSE		INTEGER		CLIST	289	294			
0 KORE		INTEGER		CLIST	289	294			
1 KOREDP		INTEGER		CLIST	289	294			
0 KOUNT		INTEGER		CLIST	289	294			
11 KOUNTH		INTEGER		CLIST	289	294			
12 KOUNTI		INTEGER		CLIST	289	294			
1 KPAGE		INTEGER		CLIST	289	294			
0 KROW		INTEGER	ARRAY	STRCLU	289	294			
2020 KSTOR		INTEGER		CLIST	289	294			
5 KTPAGE		INTEGER		CLIST	289	294			
2 LINES		INTEGER		CLIST	289	294			
10 LINESG		INTEGER		CLIST	289	294			
3 LINEST		INTEGER		CLIST	289	294			
0 LKLUEV		INTEGER		CLUEV	289	294			
0 MB		INTEGER		BAL	289	294			
121 MBDOF		INTEGER		BAL	289	294			
26 MORBAL		INTEGER		KLUES	289	294			
5 MSADD		INTEGER		KLUES	289	294			
0 MSTAR		INTEGER		STORES	289	294			
71317 MUMJ		INTEGER		*UNDEF	289	294			
2 M1		INTEGER		STRCLU	289	294			
3 M2		INTEGER		STRCLU	289	294			
4 M3		INTEGER		STRCLU	289	294			
5 M4		INTEGER		STRCLU	289	294			
2023 N		INTEGER		REFS	681	687			
71357 NAME		INTEGER	ARRAY	REFS	680	689			
71440 NAMFLX		INTEGER	ARRAY	REFS	15	531			
71361 NAM1		INTEGER	ARRAY	REFS	21	289			
71363 NAM2		INTEGER	*UNDEF	REFS	15	533			
71365 NAM3		INTEGER	*UNDEF	REFS	15	533			
71367 NAM4		INTEGER	*UNDEF	RFFS	15	533			

SUBROUTINE	READY	74/74	OPT=1	RELOCATION	74/74	OPT=1	RELOCATION	74/74	OPT=1
VARIABLES	SN	TYPE							
13	NBAR	INTEGER		KLUES	70				
0	NBYTES	INTEGER		CBYTES	74	156	311	1066	DEFINED
20	NCYC	INTEGER		KLUES	70				157
4	NDESMO	INTEGER		SIZES	52				
5	NDESYS	INTEGER		SIZES	52	533	DEFINED	532	
174	NDFOFT	INTEGER		INVERT	94				
2	NDYDOF	INTEGER		SIZES	52	286	287	2*290	2*304
14	NFIX	INTEGER		KLUES	216				
0	NMBAL	INTEGER		BAL	REFS				
2026	NN	INTEGER		REFS	70	37	DEFINED	627	
21	NNN	INTEGER		REFS	2*689	2*690	DEFINED	688	694
3	NNOPT	INTEGER		KLUES	REFS				
6	NPAGE	INTEGER		SIZES	52				
6	NPASS	INTEGER		CLIST	REFS				
1	NSTDOF	INTEGER		KLUES	REFS				
0	NSTMEM	INTEGER		SIZES	52				
77	NSTOR	INTEGER		INVERT	REFS				
71333	NUMB	INTEGER		STORES	94				
0	NUMSTR	INTEGER		COLS	REFS				
12	NVAR	REAL		ACCEL	REFS				
52	RILSTP	REAL		*UNDEF	REFS				
2052	ROE	REAL		*UNDEF	REFS				
71424	S	REAL		ARRAY	REFS				
52	SAVSTP	REAL		RESIZE	REFS				
362	SCALE	REAL		STORES	REFS				
1	SCLNEW	REAL		RESIZE	REFS				
25	SCLOLD	REAL		RESIZE	REFS				
2031	STEP1	* REAL		DEFINED	89				
2032	STEP2	* REAL		REFS	764	DEFINED	764		
11	SIPOLD	REAL		REFS	765	DEFINED	761		
653	STRFDN	REAL		REFS	86	DEFINED	761		
615	STRFDO	REAL		REFS	79	725	DEFINED	724	
463	STRF1	REAL		REFS	79	724	DEFINED	724	
557	STRFN	REAL		ARRAY	REFS				
521	STRFO	REAL		ARRAY	REFS				
305	STRIDN	REAL		ARRAY	REFS				
266	STRIDO	REAL		ARRAY	REFS				
122	STRII	REAL		ARRAY	REFS				
160	STRIN	REAL		ARRAY	REFS				
141	STRIO	REAL		ARRAY	STORES				
343	STRRDN	REAL		ARRAY	STORES				
324	STRRDO	REAL		ARRAY	STORES				
177	STRRI	REAL		ARRAY	STORES				
235	STRRN	REAL		ARRAY	STORES				
216	STRRO	REAL		ARRAY	STORES				
261	STRWDN	REAL		ARRAY	STORES				
254	STRWDO	REAL		ARRAY	STORES				
103	STRWI	REAL		ARRAY	STORES				

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			RELOCATION		
VARIABLES	SN	TYPE	STORES	DEFINED	
115	STRWN	REAL	ARRAY	REFS DEFINED	699
110	STRWO	REAL	ARRAY	REFS DEFINED	79
265	S1MB	REAL	ARRAY	REFS REFS	701
311	S2MB	REAL	ARRAY	REFS REFS	79
335	S3MB	REAL	ARRAY	REFS REFS	37
71432	T	REAL	ARRAY	REFS REFS	37
71345	VALUE	REAL	*UNDEF	REFS REFS	20
10	VDES	REAL	KLUES	REFS REFS	695
25	VMBIN	REAL	ARRAY	REFS REFS	13
75	VMBNEW	REAL	ARRAY	REFS REFS	70
51	VMBOLD	REAL	ARRAY	REFS REFS	37
10	VNEW	REAL	STRCLU	REFS REFS	761
0	VNSAVE	REAL	VSAVE	REFS REFS	86
7	VOLD	REAL	STRCLU	REFS REFS	762
1	VOSAVE	REAL	VSAVE	REFS REFS	762
6	VS	REAL	STRCLU	REFS REFS	37
3	WBOTH	REAL	WAVTS	REFS REFS	673
0	WINITT	REAL	WAVTS	REFS REFS	73
2	WMB	REAL	WAVTS	REFS REFS	625
2557	WORK	REAL	ARRAY	REFS REFS	1101
4	WPRES	REAL	WAVTS	REFS REFS	24
1	WST	REAL	WAVTS	REFS REFS	624

## FILE NAMES MODE

TAPE6 FMT

VARIABLES USED AS FILE NAMES, SEE ABOVE

WRITES 292

297

## EXTERNALS TYPE ARGS REFERENCES

303 534

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## STATEMENT LABELS

DEF LINE REFERENCES

302 294

307 156

622 506

691 688

696 694

679 727

716 705

726 718

728 681

803 774

825 310

1058 675

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COMMON BLOCKS		LENGTH	MEMBERS - BIAS NAME(LENGTH)	PROPERTIES	
BAL		241	O NMBAL (1)		1 IDBAL (20)
500	700	1025	823	INSTACK	21 VMBIN (20)
634	701	1064	827	INSTACK	61 VMBNEW (20)
636	760	1100	1027	OPT	81 MBDOF (60)
1411	9000	1134	216	OPT	161 DRVMBO (20)
1413	9002	1135		EXT REFS	181 S1MB (20)
1416	9003	1136		EXT REFS	221 S2MB (20)
1421	9004	1137		EXT REFS	
1434	9005	1137		EXT REFS	
1437	9006	1140		EXT REFS	
1451	9007	1141		EXT REFS	
1465	9008	1144		EXT REFS	
1467	9009	1147		EXT REFS	
1472	9010	1148		EXT REFS	
1503	9011	1149		EXT REFS	
1513	9012	1151		EXT REFS	
1527	9013	1153		EXT REFS	
1532	9014	1161		EXT REFS	
1542	9015	1162		EXT REFS	
1545	9016	1164		EXT REFS	
1553	9017	1165		EXT REFS	
1560	9018	1166		EXT REFS	
1570	9019	1167		EXT REFS	
1600	9020	1169		EXT REFS	
1604	9021	1171		EXT REFS	
1612	9022	1172		EXT REFS	
1663	9023	1173		EXT REFS	
1715	9024	1174		EXT REFS	
1742	9025	1175		EXT REFS	
1762	9026	1176		EXT REFS	
1765	9027	1177		EXT REFS	
1776	9028	1177		EXT REFS	
1120	9050	1192		EXT REFS	
1241	9051	1196		EXT REFS	
1247	9052	1197		EXT REFS	
1257	9053	1197		EXT REFS	
1111	9054	1199		EXT REFS	
1144	9055	1199		EXT REFS	
1116	9056	1199		EXT REFS	
0	9999	1201		EXT REFS	
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	
110	92	I	294 302	308	EXT REFS
223	386	NN	688 691	48	INSTACK
235	387	NN	694 696	38	INSTACK
254	391	K	705 716	11B	OPT
272	392	K	718 726	10B	OPT
345	398	I	774 803	13B	EXT REFS
503	680	K	775 775	1B	EXT REFS
511	K		1029 1058	13B	NOT INNER
	O		1030 1030	1B	EXT REFS

SUBROUTINE READY	74/74	OPT=1
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
	6	3 IDENS (1) 6 ISRAT (1) 9 INPUT (1) 12 JINITT (1) 15 JOLDT (1) 18 JDRV (1) 21 JSPR3 (1)
PLACES	98	0 NSTMEM 3 NNOPT (1) 0 IUIN1 (1) 3 IUOUT2 (1) 6 IUGO3 (1) 9 IFSCR (1) 12 IFS3 (1) 15 IUPR (1) 18 IUY (1) 21 IFMEMN (1) 24 IUKS (1) 27 IFB (1) 30 IUMDBI (1) 33 IFADDI (1) 36 IUDESI (1) 39 IFWTI (1) 42 IUBT (1) 45 IFDESN (1) 48 IUMEMF (1) 51 IFSTFO (1) 54 IUADD (1) 57 IFBAL (1) 60 IUWT (1) 63 IFDUM1 (1) 66 IUDUM3 (1) 69 IFL (1) 72 TUZ (1) 75 IFZR (1) 78 IUBR (1) 81 IFPHTF (1) 84 IUMODK (1) 87 IFPHT (1) 90 IUQ (1) 93 IFPH (1) 96 IUINCK (1) 0 KLUSE (1) 3 KLUMD (1) 6 NPASS (1) 9 EPS1 (1) 12 NFIX (1) 15 EPS2 (1) 18 IBAND (1) 21 KLUQ (1) 0 WINITT (1) 3 WBOTH (1) 0 NBYTES (1) 0 IPOTS (20) 0 KORE (1) 0 KOUNT (1) 3 LINEST (1)
KLUES	24	4 IOLDT (1) 7 IMINT (1) 10 NVAR (1) 13 JMINT (1) 16 JNEWT (1) 19 JSPR1 (1) 1 NSTDFF (1) 4 NDESNO (1) 1 IUIN2 (1) 4 IUGD1 (1) 7 IUGO4 (1) 10 IFS1 (1) 13 IFS4 (1) 16 IUA (1) 19 IFY (1) 22 IUSTFN (1) 25 IFKS (1) 28 IUDESO (1) 31 IFMDBI (1) 33 IFAADDI (1) 34 IUFBALI (1) 37 IFDESI (1) 40 IUMEMO (1) 43 IFBT (1) 46 IUMD (1) 49 IFMEMF (1) 52 IUMDB (1) 55 IFADD (1) 58 IUDESF (1) 61 IFWT (1) 64 IUDUM2 (1) 67 IFDUM3 (1) 70 IUYT (1) 73 IFZ (1) 76 IULR (1) 79 IFBR (1) 82 IUMODM (1) 85 IFMODK (1) 88 IUQT (1) 91 IFQ (1) 94 IUINCM (1) 97 IFINCK (1) 0 KLUAL (1) 3 KLUMD (1) 6 NPASS (1) 9 EPS1 (1) 12 NFIX (1) 15 EPS2 (1) 18 IBAND (1) 21 KLUQ (1) 0 WINITT (1) 3 WBOTH (1) 0 NBYTES (1) 0 IPOTS (20) 0 KORE (1) 0 KOUNT (1) 3 LINEST (1)
WAYS	6	4 IRED (1) 5 MSADD (1) 8 VDES (1) 11 NBAR (1) 14 DEL (1) 17 NNN (1) 20 KLUB (1) 23 DBAL (1) 2 WMB (1) 5 DW (1)
CBYTES	1	1 KOREDP (1) 1 KPAGE (1) 4 KLABEL (1)
FILE	20	2 LINES (1)
CORE	2	5 KTPAGE (1)
CLIST	11	

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PAGE

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SUBROUTINE READY

74/74

OPT=1

COMMON BLOCKS LENGTH

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MEMBERS - BIAS NAME(LENGTH)

6 NPAGE (1)

9 KOUNTH (1)

O NUMSTR (1)

32 IDYDOF (30)

72 STRWO (5)

97 STRIO (15)

142 STRRO (15)

177 STRWDN (5)

212 STRRDO (15)

307 STRFI (30)

397 STRFDO (30)

0 ICYCLE (1)

3 M2 (1)

6 VS (1)

9 STPOLD (1)

0 IUSTRI (1)

3 IFMREF (1)

0 ISIZE (1)

41 ITESTO (1)

0 ISTOP (1)

7 DINEW (15)

42 RILSTP (1)

0 ITAPER (1)

0 ITAPES (50)

0 INVERT (1)

3 AORD (30)

123 IPREV (1)

0 VNSAVE (1)

0 LKLUEV (1)

7 KBPAGE (1)

10 KOUNTI (1)

1 KCONST (1)

62 IDSTR (5)

77 STRWN (5)

112 STRIN (15)

157 STRRN (15)

182 STRDO (15)

227 STRRDN (15)

337 STRFO (30)

427 STRFDN (30)

1 ISTEP (1)

4 M3 (1)

7 VOLD (1)

5 M4 (1)

8 VNEW (1)

1 IFSTRI (1)

4 TUMOD (1)

1 SCLNEW (20)

42 SAVSTP (1)

1 IPAR (1)

22 DWOLD (5)

27 DIOLD (15)

2 IUMREF (1)

5 IFMOD (1)

21 SCOLD (20)

43 IDUB (1)

2 DNEW (5)

27 DIOLD (15)

2 ITAPEP (1)

1 IU2 (1)

33 IPERM (30)

124 NDFT (1)

1 VOSAVE (1)

1 KLUEV (20)

EQUIV CLASSES LENGTH

MEMBERS - BIAS NAME(LENGTH)

0 IRDE (1)

0 IBUF (1)

0 IWORK (1)

0 MB (1)

0 MSTOR (1)

0 KSTOR (1)

O JCHART (4)

## STATISTICS

PROGRAM LENGTH

71506B

29510

22508

1192

CM LABELED COMMON LENGTH

52000B CM USED

O CHART (4)

2 IFLEX (1)

63 NSTOR (60)

PAGE 31



SUBROUTINE DYNMAS

74/74

OPT=1

FTN 4.8+577

PAGE 2

85/01/23. 08.10.44

```

IOMD=KLUEV(4)
IOMALL=KLUEV(5)
IERR=0
IF(NCYC.GT.0) GO TO 9999

C **** THE FOLLOWING LINES OF FASTOP CODE HAVE *
C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT *
C * USED IN THE CURRENT VERSION OF ESP. *
C ****
C THERE ARE TWO INDEPENDENT PATHS THROUGH THIS SUBROUTINE. NAMELY PATHS
C FOR KLUMD=1 AND KLUMD=0, RESPECTIVELY.
C IF(KLUMD.EQ.0) GO TO 1000

C KLUMD=1 IF NPASS=0, READ IN THE INITIAL DYNAMIC MASS MATRIX, MDB,
C AND SET MD=MDB.
C IF NPASS=1, COMPUTE THE INCREMENTAL DYNAMIC MASS MATRIX
C (BEYOND MDB) AND UPDATE MD.
C IF(NPASS.NE.0) GO TO 500

C IF(KLUSE.LT.2) GO TO 50
C READ IN TOTAL INITIAL WEIGHT (STRUCTURAL+NON-OPTIMUM ITEMS)

C READ(1UCD,9002) WINITT
C WPRES=WINITT+WBOTH
C DW=0.O
C WRITE(IUPR,9003) WINITT,WPRES
C KOUNT=KOUNT+5
C 50 CONTINUE
C **** END OF CODE THAT HAS BEEN COMMENTED OUT.
C ****
C READ IN MDB-CARDS-LOWER TRIANGLE ONLY.
C CALL PUDLAB(BHDYNMASO1,IUMD,NAMMD,IFMD,NDYDOF,NDYDOF)
C IF(KLUSE.NE.2) GO TO 60
C IFDUM=1
C CALL PUDLAB(BHDYNMASO3,IUMD,NAMDB,IFDUM,NDYDOF,NDYDOF)
C CALL PUDLAB(BHDYNMASO2,IUMD,NAMDB,IFMDB,NDYDOF,NDYDOF)
C 60 CONTINUE
C IMIN = 25
C IF (IMASS.EQ.2) IMIN = 20
C IF (IMASS.EQ.0) GO TO 70
C IF (IDYFLX.EQ.0)
C 1CALL NASTRD(IMASS,IMIN,1,2,1,NDYDOF,NDYDOF,BUFFER)
C IF (IDYFLX.NE.0)
C 1CALL NASTRD(IMASS,IMIN,2,2,1,NDYDOF,NDYDOF,BUFFER)
C NASTRD - 1
      
```

```

DYNMAS      59
DYNMAS      60
DYNMAS      61
DYNMAS      62
DYNMAS      63
DYNMAS      64
DYNMAS      65
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DYNMAS      67
DYNMAS      68
DYNMAS      69
DYNMAS      70
DYNMAS      71
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DYNMAS      100
DYNMAS     101
DYNMAS     102
DYNMAS     103
DYNMAS     104
DYNMAS     105
DYNMAS     106
DYNMAS     107
DYNMAS     108
DYNMAS     109
DYNMAS     110
DYNMAS     111
DYNMAS     112
DYNMAS     113
DYNMAS     114
DYNMAS     115
      
```

```

115      C    70 MORE = 0
          IF (IMASS.EQ.0 AND.KLUEV(8).EQ.2)
          IWRITE (6,9015) NDYDOF,NDYDOF
          DO 160 I=1,NDYDOF
          C
          INEXT=I+1
          DO 80 J=1,I
          80 BUFFER(J)=0.0
          IF (IMASS.NE.0) GO TO 140
          NADD=0
          C
          IF (MORE.NE.0) GO TO 110
          C
          85 READ(1MIN,9001) (NR(K),NC(K),WW(K),K=1,3)
          KS=1
          NCARD=0
          DO 90 K=1,3
          IF (NR(K).EQ.0) GO TO 100
          90 NCARD=NCARD+1
          C
          100 IF (NCARD.EQ.0) GO TO 170
          C
          110 DO 120 K=KS,NCARD
          IF (NR(K)-1) 210,115,130
          C
          115 L=NC(K)
          **** THE FOLLOWING LINE OF FASTOP CODE HAS ****
          C * BEEN COMMENTED OUT BECAUSE IT IS NOT *
          C * USED IN THE CURRENT VERSION OF ESP. *
          C **** **** **** **** **** **** **** **** ****
          C
          IF (L.LT.1.OR.L.GT.I) GO TO 211
          BUFFER(L)=WW(K)
          IF (L.EQ.I.AND.BUFFER(L).GT.0.) NADD=1
          120 CONTINUE
          C
          MORE=0
          GO TO 85
          C
          130 IF (NR(K).NE.INEXT) GO TO 212
          IF (NADD.NE.1) GO TO 213
          IF (KLUEV(8).EQ.2)
          IWRITE (6,9016) I,(BUFFER(L),L=1,I)
          GO TO 150
          140 CALL NASTRD(IMASS,IMIN,1,2,2,NDYDOF,NDYDOF,BUFFER)
          150 CONTINUE
          IF (KLUE .EQ.2) CALL PUTROW(IUMDB,-1,BUFFER,I)
          CALL PUTROW(IUMD,1,BUFFER,I)
          KS=K
          MORE=1
          C
          160 CONTINUE
          C
          IF (IMASS.NE.0)
          1CALL NASTRD(IMASS,IMIN,1,2,3,NDYDOF,NDYDOF,BUFFER)

```

```

      IF (IMASS.NE.0) GO TO 180
170 IF(I.NE.NDYDOF) GO TO 214
      IF(NADD.NE.1) GO TO 213
      IF (KLUEV(8).EQ.2)
      1 WRITE (6,9016) I,(BUFFER(L),L=1,1)
      IF(KLUSE.EQ.2) CALL PUTROW(IUMDB,-1,BUFFER,I)
      CALL PUTROW(IUMD,1,BUFFER,I)
180 CALL DCLOSE(IUMD)
      IF(KLUSE.EQ.2) CALL DCLOSE(IUMDB)

C          GO TO 9999
C          210 MAD=210
C          GO TO 220
C **** THE FOLLOWING LINES OF FASTOP CODE HAVE
C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT
C * USED IN THE CURRENT VERSION OF ESP.
C ****
C 211 MAD=211
C          GO TO 220
C **** END OF CODE THAT HAS BEEN COMMENTED OUT.
C ****
C 212 MAD=212
C          GO TO 220
C 213 MAD=213
C          GO TO 220
C 214 MAD=214
C          220 IERR=1
C          KOUNT=LINES
C          CALL TITLES(2)
C          WRITE(IUPR,9004) MAD,(NR(M),NC(M),WW(M),M=1,3)
C          GO TO 9999
C **** THE FOLLOWING LINES OF FASTOP CODE HAVE
C * BEEN COMMENTED OUT BECAUSE THEY ARE NOT
C * USED IN THE CURRENT VERSION OF ESP.
C ****
C 500 CONTINUE
C          COMPUTE DMSB -- THE INCREMENTAL MASS MATRIX (STRUCT, GRID, DIAGONAL)
C 1. BEYOND THE INITIAL DESIGN ASSOCIATED WITH MDB.
C 2. TRANSFORM DMSB TO THE DYNAMICS GRID, DMDB=B*DMSB*B'.
C   IF IRED=0, DMDB=DMSB.
C 3. UPDATE MD, MD=MDB+DMDB
C          CALL STRMAS(WORK,BUFFER,2,WALL)
C          CALL PROGNA(4H(DYN,4HMAS))
C          C
173      DYNMAS
174      DYNMAS
175      DYNMAS
176      DYNMAS
177      DYNMAS
178      DYNMAS
179      DYNMAS
180      DYNMAS
181      DYNMAS
182      DYNMAS
183      DYNMAS
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218      DYNMAS
219      DYNMAS
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223      DYNMAS
224      DYNMAS
225      DYNMAS
226      DYNMAS
227      DYNMAS
228      DYNMAS
229      DYNMAS

```

```

230      IF(IOMALL .NE. 2) GO TO 509
C       KOUNT=LINES
C       K=0
C       DO 508 I=1,NSTDOF
C       IR=I
C       IF((WORK(I).EQ.0.0)) GO TO 502
C       K=K+1
C       NUMB(K)=IR
C       VALUE(K)=WORK(I)
C       502  IF(K.EQ.6) GO TO 504
C           IF((IR.EQ.NSTDOF AND .K.GT.0)) GO TO 504
C           GO TO 508
C       504  CALL TITLES(2)
C           IF(KOUNT.GT.KOUNTH) GO TO 506
C           WRITE(IUPR,9005)
C           KOUNT=KOUNT+5
C           WRITE(IUPR,9006) (NUMB(L),VALUE(L),L=1,K)
C           KOUNT=KOUNT+1
C           K=0
C           508  CONTINUE
C           509  CONTINUE
C           IF(IRED.EQ.0) GO TO 700
C           CALL GEDLAB(8HDYNMASO1,IUBT,NAME,IFBT,KROW,KCOL)
C           CALL PUDLAB(8HDYNMASO3,IUGO2,NAMDUM,IFS2,KROW,KCOL)
C           DO 520 J=1,NSTDOF
C               CALL GETROW(IUBT,1,BUFFER,KCOL)
C               DO 510 J=1,KCOL
C                   BUFFER(J)=BUFFER(J)*WORK(J)
C                   520  CALL PUTROW(IUGO2,1,BUFFER,KCOL)
C               CALL DCLOSE(IUBT)
C               CALL DCLOSE(IUGO2)
C               IPOS(IUB)=IFB
C               IPOS(IUGO2)=IFS2
C               IPOS(IUGO1)=IFS1
C               IPOS(IUGO3)=IFS3
C               IPOS(IUGO4)=IFS4
C               CALL MULT(KORR,WORK,WORK,IUB,IUGO2,IUGO1,IUGO3,IUGO4,
C               *NADMDB,O)
C               525  IF(IUMALL.EQ.2) CALL PRMAT1(IUGO1,IFS1,WORK,1,IUPR,7,81,
C               1 81H (INCREMENTAL MASS MATRIX (DYNAMIC GRID) WITH RESPECT TO INITI
C               2AL MASS MATRIX MDB)
C               CALL PROGNA(4H(DYN,4HMAS))
C               CALL GEDLAB(8HDYNMASO2,IUMDB1,NAME,IFMDB1,KROW,KCOL)
C               CALL GEDLAB(8HDYNMASO3,IUGO1,NAME,IFS1,LROW,LCOL)
C               CALL PUDLAB(8HDYNMASO4,IUMD,NAMMD,IFMD,KROW,KCOL)
C               IF(KLUSE.NE.2) GO TO 530

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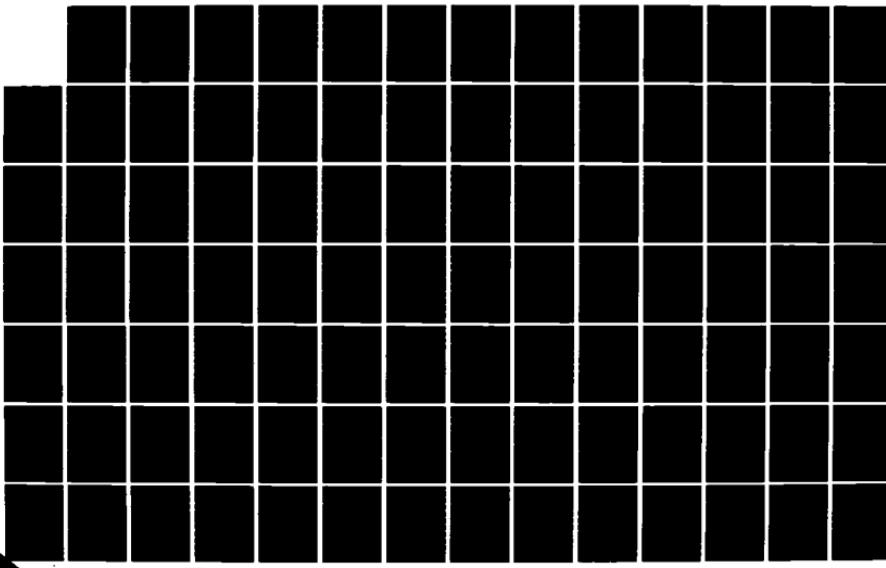
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PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J B SNEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1

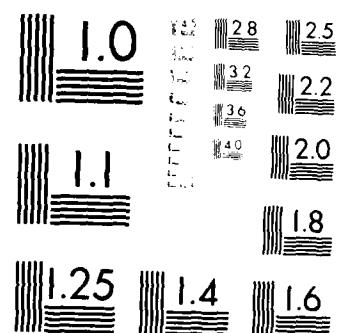
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3/8

F/G 9/2

NL





MICROCOPY RESOLUTION TEST CHART  
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SUBROUTINE DYNMAS 74/74 OPT=1

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```
C 530 CONTINUE          DYNMAS 287
C
C DO 550 I=1,KROW      DYNMAS 288
C CALL GETROW(IUMDBI,1,WORK,KCOL)    DYNMAS 289
C CALL GETROW(IUGO1,1,BUFFER,LCOL)
C DO 540 J=1,1          DYNMAS 290
C BUFFER(J)=BUFFER(J)+WORK(J)      DYNMAS 291
C CALL PUTROW(IUMD,1,BUFFER,1)      DYNMAS 292
C IF(KLUSE.EQ.2) CALL PUTROW(IUMDB,1,WORK,1)
C 550 CONTINUE          DYNMAS 293
C
C CALL DCLOSE(IUMDBI)          DYNMAS 294
C CALL DCLOSE(IUGO1)          DYNMAS 295
C CALL DCLOSE(IUMD)          DYNMAS 296
C IF(KLUSE.EQ.2) CALL DCLOSE(IUMDB)  DYNMAS 297
C
C GO TO 9999            DYNMAS 298
C
C 700 CONTINUE          DYNMAS 299
C
C CALL GEDLAB(8HDYNMAS04,IUMDBI,NAME,IFMDBI,KROW,KCOL)
C CALL PUDLAB(8HDYNMAS06,IUMD,NAMMD,IFMD,KROW,KCOL)
C IF(KLUSE.NE.2) GO TO 720
C CALL PUDLAB(8HDYNMAS07,IUMDB,NAMMDB,IFMDB,KROW,KCOL)
C
C 720 CONTINUE          DYNMAS 300
C
C DO 740 I=1,KROW      DYNMAS 301
C CALL GETROW(IUMDBI,1,BUFFER,KCOL)    DYNMAS 302
C IF(KLUSE.EQ.2) CALL PUTROW(IUMDB,-1,BUFFER,1)
C BUFFER(I)=BUFFER(I)+WORK(I)
C CALL PUTROW(IUMD,1,BUFFER,1)
C 740 CONTINUE          DYNMAS 303
C
C CALL DCLOSE(IUMDBI)          DYNMAS 304
C CALL DCLOSE(IUMD)          DYNMAS 305
C IF(KLUSE.EQ.2) CALL DCLOSE(IUMDB)  DYNMAS 306
C
C GO TO 9999            DYNMAS 307
C
C 760 CONTINUE          DYNMAS 308
C
C CALL GEDLAB(8HDYNMAS04,IUMDBI,NAME,IFMDBI,KROW,KCOL)
C CALL PUDLAB(8HDYNMAS06,IUMD,NAMMD,IFMD,KROW,KCOL)
C IF(KLUSE.NE.2) GO TO 780
C CALL PUDLAB(8HDYNMAS07,IUMDB,NAMMDB,IFMDB,KROW,KCOL)
C
C 780 CONTINUE          DYNMAS 309
C
C DO 790 I=1,KROW      DYNMAS 310
C CALL GETROW(IUMDBI,1,BUFFER,KCOL)    DYNMAS 311
C IF(KLUSE.EQ.2) CALL PUTROW(IUMDB,-1,BUFFER,1)
C BUFFER(I)=BUFFER(I)+WORK(I)
C CALL PUTROW(IUMD,1,BUFFER,1)
C 790 CONTINUE          DYNMAS 312
C
C CALL DCLOSE(IUMDBI)          DYNMAS 313
C CALL DCLOSE(IUMD)          DYNMAS 314
C IF(KLUSE.EQ.2) CALL DCLOSE(IUMDB)  DYNMAS 315
C
C 810 CONTINUE          DYNMAS 316
C
C CALL GEDLAB(8HDYNMAS04,IUMDBI,NAME,IFMDBI,KROW,KCOL)
C CALL PUDLAB(8HDYNMAS06,IUMD,NAMMD,IFMD,KROW,KCOL)
C IF(KLUSE.NE.2) GO TO 830
C CALL PUDLAB(8HDYNMAS07,IUMDB,NAMMDB,IFMDB,KROW,KCOL)
C
C 830 CONTINUE          DYNMAS 317
C
C DO 850 I=1,KROW      DYNMAS 318
C CALL GETROW(IUMDBI,1,BUFFER,KCOL)    DYNMAS 319
C IF(KLUSE.EQ.2) CALL PUTROW(IUMDB,-1,BUFFER,1)
C BUFFER(I)=BUFFER(I)+WORK(I)
C CALL PUTROW(IUMD,1,BUFFER,1)
C 850 CONTINUE          DYNMAS 320
C
C CALL DCLOSE(IUMDBI)          DYNMAS 321
C CALL DCLOSE(IUMD)          DYNMAS 322
C IF(KLUSE.EQ.2) CALL DCLOSE(IUMDB)  DYNMAS 323
C
C 870 CONTINUE          DYNMAS 324
C
C DO 890 I=1,KROW      DYNMAS 325
C CALL GETROW(IUMDBI,1,BUFFER,KCOL)    DYNMAS 326
C IF(KLUSE.EQ.2) CALL PUTROW(IUMDB,-1,BUFFER,1)
C BUFFER(I)=BUFFER(I)+WORK(I)
C CALL PUTROW(IUMD,1,BUFFER,1)
C 890 CONTINUE          DYNMAS 327
C
C GO TO 9999            DYNMAS 328
C
C 1000 CONTINUE          DYNMAS 329
C
C KLUMD=0   1. READ IN FIXED MASS DATA-IF ANY. DYNMAS 330
C           (CARDS IF NPASS=0. TAPE IF NPASS=1) DYNMAS 331
C           2. COMPUTE THE TOTAL MASS MATRIX,MS. (STRUCT.GRID,DIAGONAL) DYNMAS 332
C           DUE TO STRUCTURAL AND MASS BALANCE ELEMENTS. DYNMAS 333
C           3. UPDATE MS TO INCLUDE FIXED MASS ITEMS. DYNMAS 334
C           4. TRANSFORM THE TOTAL MASS MATRIX,MS. TO THE DYNAMICS DYNMAS 335
C           GRID- MD=B*MS*BT (IF IRD=0, MD=MS). DYNMAS 336
C
C NMS=0   WFIX=0.0
C           IF(MSADD.EQ.0) GO TO 1100 DYNMAS 337
C
C           338
C           339
C           340
C           341
C           342
C           343
```

```

C      IF(NPASS.NE.0) GO TO 1060
C      READ IN FIXED MASS DATA-(CARDS. FULL MATRICES)
C      IF(KLUSE.EQ.2) READ(IUCD,9002) WFIX
C
345      C      I=0
C      LASTR=1
C1010    READ(IUCD,9001) (NR(K),NC(K),WW(K),K=1,3)
C      IF(NR(1).EQ.0) GO TO 1030
C      DO 1020 K=1,3
C      IF(NR(K).EQ.0) GO TO 1010
C      IF(NR(K).LT.LASTR) GO TO 1040
C      LASTR=NR(K)
C
350      C      I=I+1
C      JCHART(1,1)=NR(K)
C      JCHART(2,I)=NC(K)
C      CHART(3,I)=WW(K)
C1020    CONTINUE
C      GO TO 1010
C1030    NMS=I
C
360      C      KOUNT=LINES
C      DO 1036 I=1,NMS
C      N=I
C      CALL TITLES(2)
C      IF(KOUNT.GT.KOUNTH) GO TO 1033
C      WRITE(IUPR,9007)
C      KOUNT=KOUNT+5
C1033    CONTINUE
C      WRITE(IUPR,9008) JCHART(1,N),JCHART(2,N),CHART(3,N)
C      KOUNT=KOUNT+1
C1036    CONTINUE
C
375      C      LEFT=LINES-KOUNT
C      NEED=3
C      IF(KLUSE.EQ.2) NEED=NEED+2
C      IF(LEFT.LT.NEED) KOUNT=LINES
C      CALL TITLES(2)
C      WRITE(IUPR,9009) NMS
C      KOUNT=KOUNT+3
C      IF(KLUSE.NE.2) GO TO 1038
C      WRITE(IUPR,9014) WFIX
C      KOUNT=KOUNT+2
C1038    CONTINUE
C
390      C      GO TO 1080
C
C1040    IERR=2
C
395      C      KOUNT=LINES
C      CALL TITLES(2)
C      WRITE(IUPR,9010) (NR(K),NC(K),WW(K),K=1,3)
C
C      GO TO 9999
C

```

```

C      DYNMAS   344
C      DYNMAS   345
C      DYNMAS   346
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C      DYNMAS   390
C      DYNMAS   391
C      DYNMAS   392
C      DYNMAS   393
C      DYNMAS   394
C      DYNMAS   395
C      DYNMAS   396
C      DYNMAS   397
C      DYNMAS   398
C      DYNMAS   399
C      DYNMAS

```

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```

400      C1060 CONTINUE
        C READ IN FIXED MASS DATA-(TAPE)
        C
        CALL GEDLAB(8HDYNMAS05,IUADDI,NNAME,IFADDI,JROW,JCOL)
        C CALL DREAD(IUADDI,ADDM斯(1),4)
        C NBYTE=4*(NMS*3)
        CALL DREAD(IUADDI,ADDM斯(2),NBYTE)
        C CALL DCLOSE(IUADDI)
        C
        C1080 CONTINUE
        C
        C IF(KLUSE.NE.2) GO TO 1100
        C JROW=2
        JCOL=999
        CALL PUDLAB(8HDYNMAS08,IUADD,NAMADD,IFADD,JROW,JCOL)
        C CALL DWRITE(IUADD,NMS,4)
        C NBYTE=4*(NMS*3)
        CALL DWRITE(IUADD,ADDM斯(2),NBYTE)
        C CALL DCLOSE(IUADD)
        C
        C1100 CONTINUE
        C COMPUTE MS--THE TOTAL MASS MATRIX (EXCLUDING FIXED MASS ITEMS) IN THE
        C STRUCTURES GRID. THIS MATRIX IS DIAGONAL.
        C
        CALL STRMAS(WORK,BUFFER,3,WALL)
        C
        C CALL PROGNA(4H(D/N,4HMAS))
        C
        C IF(NPASS.NE.0.OR.KLUSE.NE.2) GO TO 1105
        C WINITT=WALL+WFIX
        C WPRES=WINITT+WBOTH
        DW=0.0
        LEFT=LINES-KOUNT
        IF(LEFT.LT.9) KOUNT=LINES
        CALL TITLES(2)
        WRITE(IUPR,9011) WINITT,WALL,WFIX,WPRES
        COUNT=KOUNT+9
        C1105 CONTINUE
        C
        C UPDATE MS TO INCLUDE ANY FIXED MASS ITEMS AND THEN TRANSFORM TO
        C THE DYNAMICS GRID.
        C
        C IF(MSADD-1) 1150,1110,1200
        C
        C1110 CONTINUE
        C
        C445 C UPDATE MS TO INCLUDE ANY FIXED MASS ITEMS AND THEN TRANSFORM TO
        C THE DYNAMICS GRID.
        C
        C MSADD=1 UPDATE MS (DIAGONAL RESULT)
        C
        C DO 1120 I=1,NMS
        C     JR=JCHART(1,1)
        C     JR=JCHART(2,1)
        C
        C455
  
```

SUBROUTINE DYNMAS 74/74 OPT=1

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C IF(JR.NE.JC) GO TO 1130  
C WORK(JR)=WORK(JR)+CHART(3,1)  
C1120 CONTINUE  
C GO TO 1150  
C  
C1130 IERR=3  
C LEFT=LINE\$-KOUNT  
C IF(LEFT.LT.5) KOUNT=LINE\$  
C CALL TITLES(2)  
C WRITE(IUPR,9012)  
C GO TO 9999  
C  
C1150 CONTINUE  
C TRANSFORM DIAGONAL MS TO MD. MD=B\*MS\*BTRANS (IF IRED=0, MD=MS)  
C IF(IRED.EQ.0) GO TO 1180  
C  
C IF(IOMALL.NE.2) GO TO 1159  
C KOUNT=LINE\$  
C K=O  
DO 1158 I=1,NSTDOF  
IR=I  
C IF(WORK(I).EQ.0.0) GO TO 1152  
C  
C NUMB(K)=IR  
C K=K+1  
C VALUE(K)=WORK(1)  
C1152 IF(K.EQ.6) GO TO 1154  
C IF(IR.EQ.NSTDOF.AND.K.GT.0) GO TO 1154  
C GO TO 1158  
C1154 CALL TITLES(2)  
C IF(KOUNT.GT.KOUNTH) GO TO 1156  
C WRITE(IUPR,9013)  
C KOUNT=KOUNT+5  
C1156 WRITE(IUPR,9006) (NUMB(L),VALUE(L),L=1,K)  
C KOUNT=KOUNT+1  
C K=O  
C1158 CONTINUE  
C  
C1159 CONTINUE  
C  
C CALL GEDLAB(8HDYNMAS06,IUBT,NAME,IFBT,KROW,KCOL)  
C CALL PUDLAB(8HDYNMAS09,IUGD03,NAMDUM,IFS3,KROW,KCOL)  
C  
C DO 1170 I=1,NSTDOF  
C CALL GETROW(IUBT,1,BUFFER,KCOL)  
C DO 1160 J=1,KCOL  
C1160 BUFFER(J)=BUFFER(J)\*WORK(I)  
C1170 CALL PUTROW(IUGD03,1,BUFFER,KCOL)  
C  
C CALL DCLOSE(IUBT)  
C CALL DCLOSE(IUGD03)  
C IPOS(IUB)=IFB

.....

SUBROUTINE DYNMAS 74/74 OPT=1

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```
C IPOS(IUMD)=IFMD          515   DYNMAS  
C IPOS(IUGO1)=IFS1          516   DYNMAS  
C IPOS(IUGO4)=IFS4          517   DYNMAS  
C CALL MULT(KORE,WORK,WORK,IUMD,IUGO3,IUMD,IUGO1,IUGO4,NAMMD,O) 518   DYNMAS  
C CALL PROGNA(4H(DYN.4HMAS)) 519   DYNMAS  
C  
520 C  
C GO TO 9999                520   DYNMAS  
C  
C1180 CONTINUE              521   DYNMAS  
C CALL PUDLAB(8HDYNMAS10,IUMD,NAMMD,IFMD,NSTDOF,NSTDOF)        522   DYNMAS  
C DO 1185 I=1,NSTDOF         523   DYNMAS  
C CALL PUTROW(IUMD,-1,WORK,I) 524   DYNMAS  
C WORK(I)=0.0                 525   DYNMAS  
C1185 CONTINUE               526   DYNMAS  
C CALL DCLOSE(IUMD)          527   DYNMAS  
C GO TO 9999                 528   DYNMAS  
C  
530 C  
C1200 CONTINUE              529   DYNMAS  
C MSADD=2 UPDATE MS (OFF DIAGONAL TERMS ARE PRESENT) 530   DYNMAS  
C  
540 C IF(IRED.EQ.0) CALL PUDLAB(8HDYNMAS11,IUMD,NAMMD,IFMD,      531   DYNMAS  
C 1 NDYDOF,NDYDOF)           532   DYNMAS  
C IF(IRED.NE.0) CALL PUDLAB(8HDYNMAS12,IUMD,NAMMS,IFMD,      533   DYNMAS  
C 1 NSTDOF,NSTDOF)           534   DYNMAS  
C  
545 C KLUPAK=-2               535   DYNMAS  
C LYNEx1                      536   DYNMAS  
C MORE=1                        537   DYNMAS  
C KUP=NSTDOF-6                  538   DYNMAS  
C  
550 C DO 1400 I=1,NSTDOF        539   DYNMAS  
C IF(MORE.EQ.0) GO TO 1210    540   DYNMAS  
C MROW=JCHART(1,LYNE)          541   DYNMAS  
C IF(I.EQ.MROW) GO TO 1250    542   DYNMAS  
C  
555 C JPAK(1)=1-I               543   DYNMAS  
C JPAK(2)=1                      544   DYNMAS  
C PAK(3)=WORK(I)                545   DYNMAS  
C JPAK(4)=I-NSTDOF             546   DYNMAS  
C  
560 C NCOUNT=4                  547   DYNMAS  
C IF(I.EQ.1.OR.I.EQ.NCOUNTP) NCOUNT=3 548   DYNMAS  
C  
C CALL DWRITE(IUMD,NCOUNT,4)    549   DYNMAS  
C CALL DWRITE(IUMD,KLUPAK,4)    550   DYNMAS  
C  
565 C J=1                         551   DYNMAS  
C IF(I.EQ.1) J=2                 552   DYNMAS  
C NBYTE=4*NCOUNT                553   DYNMAS  
C CALL DWRITE(IUMD,PAK(J),NBYTE) 554   DYNMAS  
C  
570 C  
C
```

SUBROUTINE DYNMAS 74/74 OPT=1

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```
C GO TO 1400          DYNMAS 572
C
C1250 CONTINUE          DYNMAS 573
C
C DO 1260 L=1,15          DYNMAS 574
C1260 PAK(L)=0.0          DYNMAS 575
C
C IF(I.GT.6) GO TO 1270          DYNMAS 576
C
C JPAK(1)=11          DYNMAS 577
C IC=1+I          DYNMAS 578
C JPAK(13)=11-NSTDOF          DYNMAS 579
C NCOUNT=13          DYNMAS 580
C GO TO 1300          DYNMAS 581
C
C1270 IF(I.GT.KUP) GO TO 1280          DYNMAS 582
C
C JPAK(1)=6-I          DYNMAS 583
C JPAK(2)=11          DYNMAS 584
C IC=8          DYNMAS 585
C JPAK(14)=(5+I)-NSTDOF          DYNMAS 586
C NCOUNT=14          DYNMAS 587
C GO TO 1300          DYNMAS 588
C
C1280 JPAK(1)=11-NSTDOF          DYNMAS 589
C JPAK(2)=11          DYNMAS 590
C IC=13-(NSTDOF-I)          DYNMAS 591
C NCOUNT=13          DYNMAS 592
C
C1300 CONTINUE          DYNMAS 593
C PAK(IC)=WORK(I)          DYNMAS 594
C MCOL=JCHART(2,LNE)          DYNMAS 595
C KK=IC+ MCOL-MROW          DYNMAS 596
C PAK(KK)=PAK(KK)+CHART(3,LNE)          DYNMAS 597
C
C LNE=LNE+1          DYNMAS 598
C IF(LNE.GT.NMS) MORE=0          DYNMAS 599
C IF(MORE.EQ.0) GO TO 1350          DYNMAS 600
C
C MROW=JCHART(1,LNE)          DYNMAS 601
C IF(MROW.EQ.1) GO TO 1310          DYNMAS 602
C
C1350 CONTINUE          DYNMAS 603
C
C CALL DWRITE(IUMD,NCOUNT,4)          DYNMAS 604
C CALL DWRITE(IUMD,KLUPAK,4)          DYNMAS 605
C NBYTE=4*NCOUNT          DYNMAS 606
C CALL DWRIT(E(IUMD,PAK(1),NBYTE)          DYNMAS 607
C
C1400 CONTINUE          DYNMAS 608
C
C CALL DCLOSE(IUMD)          DYNMAS 609
C
C TRANSFORM MS TO THE DYNAMICS GRID. MD=B*MS*BT          DYNMAS 610
C (IF IRED=0, MD=MS)          DYNMAS 611
C
C1400 CONTINUE          DYNMAS 612
C
C CALL DWRITE(IUMD,NCOUNT,4)          DYNMAS 613
C CALL DWRITE(IUMD,KLUPAK,4)          DYNMAS 614
C NBYTE=4*NCOUNT          DYNMAS 615
C CALL DWRIT(E(IUMD,PAK(1),NBYTE)          DYNMAS 616
C
C1400 CONTINUE          DYNMAS 617
C
C CALL DCLOSE(IUMD)          DYNMAS 618
C
C TRANSFORM MS TO THE DYNAMICS GRID. MD=B*MS*BT          DYNMAS 619
C (IF IRED=0, MD=MS)          DYNMAS 620
C
C1400 CONTINUE          DYNMAS 621
C
C CALL DWRITE(IUMD,NCOUNT,4)          DYNMAS 622
C CALL DWRITE(IUMD,KLUPAK,4)          DYNMAS 623
C NBYTE=4*NCOUNT          DYNMAS 624
C CALL DWRIT(E(IUMD,PAK(1),NBYTE)          DYNMAS 625
C
C1400 CONTINUE          DYNMAS 626
C
C CALL DCLOSE(IUMD)          DYNMAS 627
C
C TRANSFORM MS TO THE DYNAMICS GRID. MD=B*MS*BT          DYNMAS 628
C (IF IRED=0, MD=MS)
```

SUBROUTINE DYNMAS 74/74 OPT=1

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```

630      IF(IRED.EQ.0) GO TO 9999
C      IF(IOMALL.EQ.2) CALL PRMAT2(IUMD,IFMD,WORK,1,IUPR,4,71,
C      1,71H (MASS MATRIX GENERATED IN FULLY AUTOMATED MASS OPTION
C      2RES GRID))
C
C      IPOS(IUMD)=IFMD
C      IPOS(IUBT)=IFBT
C      IPOS(IUG03)=IFBS3
C      IPOS(IUIN1)=IFSCR
C      IPOS(IUG04)=IFS4
C
C      CALL MULT(KORE,WORK,WORK,WORK,IUBT,IUMD,IUG03,IUIN1,IUG04,
C      *NAMDUM,0)
C
C      IPOS(IUB)=IFB
C      IPOS(IUG03)=IFS3
C      IPOS(IUMD)=IFMD
C      IPOS(IUG01)=IFS1
C      IPOS(IUG04)=IFS4
C
C      CALL MULT(KORE,WORK,WORK,WORK,IUB,IUG03,IUIN1,IUG04,N
C      CALL PROGNA(4H(DYN,4HMAS))
C
C      **** END OF CODE THAT HAS BEEN COMMENTED OUT. *
C      ****
C
C      9001 FORMAT(3(214,F15.5,1X))
C      9002 FORMAT(E15.5)
C      9003 FORMAT/.10X,
C      1          F15.4,
C      2          //,10X,
C      9004 FORMAT(/,10X,
C      1          //,10X,
C      2          //,10X,
C      3          //,10X,
C      4          //,10X,
C      5          //,10X,
C      6          //,10X,
C      7          //,10X,
C      8          //,10X,
C      9005 FORMAT(/,10X,
C      1          //,10X,
C      2          //,10X,
C      9006 FORMAT(10X,6(15.1PE15.5)
C      9007 FORMAT(/,10X,
C      1          //,10X,
C      9008 FORMAT(10X,215.1PE15.5)
C      9009 FORMAT(/,10X,
C      1          //,10X,
C      9010 FORMAT(/,10X,
C      1          //,10X,
C      2          //,10X,
C
C      635      10HTHERE ARE .15. 24H FIXED ADDITIONS TO MASS MATRIX (STRUCT.
C      1          23HSTRUCTURAL MASS MATRIX ./.)
C      640      39HTHE FIXED MASS DATA IS NOT IN ROW SORT.
C      1          38HTHE OFFENDING DATA CARD IS SHOWN BELOW.
C      2          214.F15.5,1X)./
C
C      645      22HPRESENT TOTAL WEIGHT = F15.4./)
C      650      42HTHERE IS AN ERROR IN THE INITIAL MASS D
C      655      33H(MAD=210) DATA IS NOT IN ROW SORT.
C      660      42H(MAD=211) DATA LIES OUTSIDE LOWER TRIAN
C      665      31H(MAD=212) ENTIRE ROW IS MISSING.
C      670      39H(MAD=213) DIAGONAL TERM IS NOT POSITIVE
C      675      32H(MAD=214) BLANK CARD ENCOUNTERED.
C      680      22HCURRENT VALUE OF MAD = 15,
C      685      27HOFENDING DATA CARD FOLLOWS.
C
C      690      43HINCREMENTAL MASS MATRIX(STRUCT. GRID) W
C      695      35HRESPECT TO INITIAL MASS MATRIX MDB.. .
C      700      2 /,10X, 6(20H ROW
C      705      45HFIXED ADDITIONS TO MASS MATRIX (STRUCT.
C      710      1          25H ROW COL
C      715      1          VALUE./)
C
C      720      10HTHERE ARE .15. 24H FIXED ADDITIONS TO
C      725      23HSTRUCTURAL MASS MATRIX ./.)
C      730      39HTHE FIXED MASS DATA IS NOT IN ROW SORT.
C      735      38HTHE OFFENDING DATA CARD IS SHOWN BELOW.
C      740      214.F15.5,1X)./

```

```

685      1   //,1CX.          31HCONTRIBUTION DUE TO STRUCTURE ".F12.4.
       2   //,10X.          42HCONTRIBUTION DUE TO FIXED MASS ADDITIONS .
       3   F12.4.           22HPRESENT TOTAL WEIGHT " .F(12.4./)
       4   //,10X.          44HOFF-DIAGONAL TERMS ARE PRESENT IN THE FIXED .
9012  FORMAT//,10X,15HMASS ADDITIONS.
       1
       2   //,10X,45HHOWEVER, THE USER DID NOT SO INDICATE IN THE .
       3   34HINPUT CLUES. (TERMINATE EXECUTION)./
9013  FORMAT//,10X,47HMASS MATRIX (STRUCT. GRID) INCLUDING FIXED MASS
       1   15H ITEMS-(IF ANY).
       2   //,10X,6(20H ROW VALUE),/
9014  FORMAT(10X,35HTHE TOTAL WEIGHT OF THESE ITEMS IS .F15.4./)
9015  FORMAT(1H1.9X,BREAEDING ,13.3H X ,13.
       1   41H DYNAMIC MASS MATRIX FROM CARD-IMAGE FILE /
       2   15X,24H(LOWER TRIANGLE PRINTED))
9016  FORMAT(/,15X,4HROW ,13//(1P0E12.4))

C
C 9999  CONTINUE
C
C  IF(IERR.NE.0) STOP
C
C  IF (KLUSE.LE.0) GO TO 9940
C
C  IUNIT=IUMD
C  IFILE=IFMD
C  NCIC=NCYC
C  CALL MASTOR(WORK,BUFFER,IUNIT,IFILE,NCIC)
C  CALL PROGNA(4H(DYN.4HMAS))
9940  CONTINUE
C
C  IUCOM=IUMD
C  IFCOM=IFMD
C  IF THE STRUCTURE IS FREE-FREE, ADJUST THE MASS MATRIX
C
C  IF(KFREE.NE.2) GO TO 9950
C
C  CALL FFMAS(WORK(1),WORK(25000),WORK(26000),WORK(27000),
1  BUFFER(1).IDYFLX,IMASS,ITRNSF,IMIN)
C  CALL PROGNA(4H(DYN.4HMAS))
C
C  IUCOM=IUMOFF
C  IFCOM=IFMDFF
C
C  9950  CONTINUE
C
C  IF(IOMD.NE.2) GO TO 9990
C
C  IF(KFREE.EQ.2) GO TO 9970
C  IF(IRED.EQ.0) GO TO 9980
C  IF(NPASS.EQ.0.AND.KLUMD.EQ.1) GO TO 9980
C
C  9970  CALL PRMAT1(IUCOM,IFCOM,WORK,1,IUPR,7.47,
1  47H (MASS MATRIX TO BE USED IN VIBRATION ANALYSIS))
GO TO 9990
C  9980  CALL PRMAT2(IUCOM,IFCOM,WORK,1,IUPR,4.47,
1  47H (MASS MATRIX TO BE USED IN VIBRATION ANALYSIS))

```

SUBROUTINE DYNMAS 74/74 OPT=1

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```

9990 CONTINUE
C
C      CALL PROGNA(4H(DYN,4HMAS))
C      CALL TIMEB(11,11HFROM DYNMAS)
C      CALL MESSAGE(2,6,6HDYNMAS)

C      RETURN
END

```

## CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM
722	I	WORK	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
722	I	WORK	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
722	I	WORK	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
3 DYNMAS	1	749				
VARIABLES	SN TYPE	RELOCATION				
1204 ADUMS	REAL	*UNDEF	REFS	8	2*12	DYNMAS 743
O BUFFER	REAL	ARRAY F.P.	REFS	4	110	DYNMAS 744
			REFS	164	175	DYNMAS 745
1205 CHART	REAL	*UNDEF	DEFINED	1	124	DYNMAS 746
15 D	REAL	KLUES	REFS	170	177	DYNMAS 747
27 DBAL	REAL	KLUES	REFS	12	149	DYNMAS 748
16 DEL	REAL	KLUES	REFS			DYNMAS 749
215 DRVMB	REAL	BAL	REFS			DYNMAS 750
241 DRVMB0	REAL	BAL	REFS			DYNMAS 751
5 DW	REAL	WAYTS	REFS			
12 DWMAX	REAL	KLUES	REFS			
11 EPS1	REAL	KLUES	REFS			
17 EPS2	REAL	KLUES	REFS			
1142 I	INTEGER	KLUES	REFS			
22 IBAND	INTEGER	KLUES	REFS			
1 IDBAL	INTEGER	ARRAY	REFS			
7 IDNOPT	INTEGER	BAL	REFS			
0 IDYFLX	INTEGER	KLUES	REFS			
0 IERR	INTEGER	F.P.	REFS			
21 IFA	INTEGER	F.P.	REFS			
67 IFADD	INTEGER	PLACES	REFS			
41 IFADDI	INTEGER	PLACES	REFS			
33 IFB	INTEGER	PLACES	REFS			
71 IFBAL	INTEGER	PLACES	REFS			
43 IFBALI	INTEGER	PLACES	REFS			
117 IFBR	INTEGER	PLACES	REFS			

SUBROUTINE DYNMAS		74/74	OPT=1	RELOCATION PLACES	18	739	DEFINED	717	726
VARIABLES	SN	TYPE							
53 IFBT	1157	IFCOM	INTEGER	REFS	REFS	REFS	REFS	REFS	REFS
73 IFDESF	45	IFDES1	INTEGER	PLACES	PLACES	PLACES	PLACES	PLACES	PLACES
55 IFDESN	35	IFDESO	INTEGER	PLACES	PLACES	PLACES	PLACES	PLACES	PLACES
21 IFDLT	101	IFDUM2	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
3 IFDLTI	1136	IFDUM	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
77 IFOUM	101	IFDUM3	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
1154 IFILE	23	IFINCK	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
141 IFINCM	137	IFMOB	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
31 IFKS	37	IFMDBI	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
105 IFLR	1	IFMDFF	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
57 IFMD	61	IFMEMF	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
25 IFMENN	51	IFMEMO	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
125 IFMODK	123	IFMODM	INTEGER	PLACES	PLACES	REFS	REFS	REFS	REFS
15 IFMPL	7	IFMPLI	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
13 IFPATF	135	IFPH	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
27 IFPHA	31	IFPHAT	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
127 IFPHT	121	IFPHFT	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
133 IFQ	131	IFQAT	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
23 IFOA	127	IFQHT	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
25 IFQAT	11	IFSCR	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
131 IFQT	17	IFS1	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
63 IFSTFN	12	IFS2	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
27 IFSTFO	13	IFS3	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
107 IFYT	15	IFS4	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
111 IFZ	111	IFTWT	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
113 IFWTI	47	IFTWTI	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
23 IFY	27	IFTWTI	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
111 IFZ	107	IFTWTI	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS
113 IFWTI	111	IFTMASS	INTEGER	PLAYFF	PLAYFF	REFS	REFS	REFS	REFS

SUBROUTINE	DYNMAS	74/74	OPT-1	RELOCATION
VARIABLES	SN	TYPE		
1137	IMIN	INTEGER		
1143	INEXT	INTEGER		
1135	IOMALL	*	INTEGER	
1134	IOMD	INTEGER		
0	IPOS	INTEGER		
2	IRED	INTEGER		
0	ITRNSF	INTEGER		
-0	IUA	INTEGER		
66	IUADD	INTEGER		
40	IUADDI	INTEGER		
32	IUB	INTEGER		
70	IUBAL	INTEGER		
42	IUBALI	INTEGER		
116	IUBR	INTEGER		
52	IUBT	INTEGER		
16	IUCD	INTEGER		
1156	IUCOM	INTEGER		
72	IUDESF	INTEGER		
44	IUDES1	INTEGER		
54	IUDES2	INTEGER		
34	IUDESO	INTEGER		
20	IUDLT	INTEGER		
2	IUDLT1	INTEGER		
76	IUDUM1	INTEGER		
100	IUDUM2	INTEGER		
102	IUDUM3	INTEGER		
4	IUGO1	INTEGER		
5	IUGO2	INTEGER		
6	IUGO3	INTEGER		
7	IUGO4	INTEGER		
140	IUINCK	INTEGER		
136	IUINCM	INTEGER		
0	IUIN1	INTEGER		
1	IUIN2	INTEGER		
30	IUKS	INTEGER		
104	IUL	INTEGER		
114	IULR	INTEGER		
56	IUMD	INTEGER		
64	IUMDB	INTEGER		
36	IUMDB1	INTEGER		
0	IUMDF	INTEGER		
60	IUMEMF	INTEGER		
24	IUMEMN	INTEGER		
50	IUMEMO	INTEGER		
124	IUMODK	INTEGER		
122	IUMODM	INTEGER		
14	IUMPL	INTEGER		
6	IUMPLI	INTEGER		
1153	IUNIT	INTEGER		
2	IUOUT1	INTEGER		
3	IUOUT2	INTEGER		
12	IUPATF	INTEGER		
134	IUPH	INTEGER		
26	IUPHA	INTEGER		

SUBROUTINE	DYNMAS	74/74	OPT-1	RELOCATION	FTN 4 8+577	85/01/23 . 08 . 10 . 44	PAGE
VARIABLES	SN	TYPE					
1143	INEXT	INTEGER			2*170 REFS DEFINED	172 110 107 156 156 1/O REFS	1 170 130 122
1135	IOMALL	*	INTEGER		REFS DEFINED	170 112 108 159 159 1/O REFS	170 130 122
1134	IOMD	INTEGER			REFS F . P.	170 112 108 159 159 1/O REFS	170 130 122
0	IPOS	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
2	IRED	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
0	ITRNSF	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
-0	IUA	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
66	IUADD	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
40	IUADDI	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
32	IUB	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
70	IUBAL	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
42	IUBALI	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
116	IUBR	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
52	IUBT	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
16	IUCD	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
1156	IUCOM	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
72	IUDESF	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
44	IUDES1	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
54	IUDES2	INTEGER			REFS PLACES	170 112 108 159 159 1/O REFS	170 130 122
34	IUDESO	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
20	IUDLT	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
2	IUDLT1	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
76	IUDUM1	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
100	IUDUM2	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
102	IUDUM3	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
4	IUGO1	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
5	IUGO2	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
6	IUGO3	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
7	IUGO4	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
140	IUINCK	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
136	IUINCM	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
0	IUIN1	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
1	IUIN2	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
30	IUKS	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
104	IUL	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
114	IULR	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
56	IUMD	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
64	IUMDB	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
36	IUMDB1	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
0	IUMDF	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
60	IUMEMF	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
24	IUMEMN	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
50	IUMEMO	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
124	IUMODK	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
122	IUMODM	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
14	IUMPL	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
6	IUMPLI	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
1153	IUNIT	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
2	IUOUT1	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
3	IUOUT2	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
12	IUPATF	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
134	IUPH	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122
26	IUPHA	INTEGER			REFS PLAYFF	170 112 108 159 159 1/O REFS	170 130 122

SUBROUTINE	DYNMAS	74/74	OPT-1	RELOCATION	FTN 4 8+577	85/01/23 . 08 . 10 . 44	PAGE
VARIABLES	SN	TYPE					
1143	INEXT	INTEGER			2*170 REFS DEFINED	172 110 107 156 156 1/O REFS	1 170 130 122
1135	IOMALL	*	INTEGER		REFS DEFINED	172 110 107 156 156 1/O REFS	1 170 130 122
1134	IOMD	INTEGER			REFS F . P.	172 110 107 156 156 1/O REFS	1 170 130 122
0	IPOS	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
2	IRED	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
0	ITRNSF	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
-0	IUA	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
66	IUADD	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
40	IUADDI	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
32	IUB	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
70	IUBAL	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
42	IUBALI	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
116	IUBR	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
52	IUBT	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
16	IUCD	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
1156	IUCOM	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
72	IUDESF	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
44	IUDES1	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
54	IUDES2	INTEGER			REFS PLACES	172 110 107 156 156 1/O REFS	1 170 130 122
34	IUDESO	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
20	IUDLT	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
2	IUDLT1	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
76	IUDUM1	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
100	IUDUM2	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
102	IUDUM3	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
4	IUGO1	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
5	IUGO2	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
6	IUGO3	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
7	IUGO4	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
140	IUINCK	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
136	IUINCM	INTEGER			REFS PLAYFF	172 110 107 156 156 1/O REFS	1 170 130 122
0	IUIN1	INTEGER			REFS PLAYFF	172 110 107 15	

RELOCATION	VARIABLES	SN	TYPE	PLACES	
				PLAYFF	PLAYFF
	IUPHT	126	INTEGER	PLACES	PLACES
	IUPHTF	120	INTEGER	PLACES	PLACES
	IUPR	17	INTEGER	PLACES	PLACES
	IUJ	132	INTEGER	PLACES	PLACES
	IUQA	22	INTEGER	PLAYFF	PLAYFF
	IUQAT	24	INTEGER	PLAYFF	PLAYFF
	IUQF	130	INTEGER	PLACES	PLACES
	IUSCR	10	INTEGER	PLACES	PLACES
	IUSLT	16	INTEGER	PLAYFF	PLAYFF
	IUSLT1	4	INTEGER	PLACES	PLACES
	IUSTFN	26	INTEGER	PLACES	PLACES
	IUSTFO	62	INTEGER	PLACES	PLACES
	IUTPGT	10	INTEGER	PLAYFF	PLAYFF
	IUWT	74	INTEGER	PLACES	PLACES
	IUWT1	46	INTEGER	PLACES	PLACES
	IUY	22	INTEGER	PLACES	PLACES
	IUYT	106	INTEGER	PLACES	PLACES
	IUZ	110	INTEGER	PLACES	PLACES
	IUZR	1112	INTEGER	PLACES	PLACES
	J	1144	INTEGER	CLIST	CLIST
	UCHART	1205	INTEGER	CLIST	CLIST
	UPAK	1160	INTEGER	CLIST	CLIST
	K	1145	INTEGER	CLIST	CLIST
	KBPAGE	7	INTEGER	CLIST	CLIST
	KFREE	0	INTEGER	CLIST	CLIST
	KLABEL	4	INTEGER	CLIST	CLIST
	KLUBAL	24	INTEGER	CLIST	CLIST
	KLUEV	4	INTEGER	CLIST	CLIST
	KLUMD	1	INTEGER	CLIST	CLIST
	KLUNAL	3	INTEGER	CLIST	CLIST
	KLUG	1	INTEGER	CLIST	CLIST
	KLUSE	25	INTEGER	CLIST	CLIST
	KORE	0	INTEGER	CLIST	CLIST
	KOUNT	0	INTEGER	CLIST	CLIST
	KOUNTH	11	INTEGER	CLIST	CLIST
	KOUNTI	12	INTEGER	CLIST	CLIST
	KPAGE	1	INTEGER	CLIST	CLIST
	KS	1146	INTEGER	CLIST	CLIST
	KTPAGE	5	INTEGER	CLIST	CLIST
	L	1150	INTEGER	CLIST	CLIST
	LINES	2	INTEGER	CLIST	CLIST
	LINESG	10	INTEGER	CLIST	CLIST
	LINEST	3	INTEGER	CLIST	CLIST
	LLKUEV	0	INTEGER	CLUEV	CLUEV
	M	1152	INTEGER	CLIST	CLIST
	MAD	1151	INTEGER	CLIST	CLIST
	MBDOF	121	INTEGER	CLIST	CLIST
	MORBAL	26	INTEGER	CLIST	CLIST
	MORE	1141	INTEGER	CLIST	CLIST
	MSADD	5	INTEGER	CLIST	CLIST
	NADC	1140	INTEGER	CLIST	CLIST
	NADMGB	2273	INTEGER	CLIST	CLIST
	NAMDCD	2275	INTEGER	CLIST	CLIST
	NAMDM	2271	INTEGER	CLIST	CLIST

```

115      C FORM PRODUCT OF LAMBDA(TRAN)*MD. STORE RESULT IN ELTMD
      C
      C LROW=NCOL
      C LCOL=NROW
      DO 80 I=1,LCOL
      DO 80 K=1,MCOL
      A=O.O
      DO 75 J=1,LROW
      IF(K.LE.J) L=((J-1)*J/2)+K
      IF(K.GT.J) L=((K-1)*K/2)+J
      A=A+ELAM(J,I)*EMAS(L)
      75 CONTINUE
      ELTMD(1,K)=A
      80 CONTINUE
130      C FORM THE PRODUCT LAMBDA(TRAN)*MD*LAMBDA. STORE RESULT IN XM
      C
      DO 82 I=1,3
      DO 82 J=1,3
      82 XM(I,J)=O.O
      C
      DO 90 I=1,LCOL
      DO 90 K=1,LCOL
      A=O.O
      DO 85 J=1,LROW
      A=A+ELTMD(I,J)*ELAM(J,K)
      85 CONTINUE
      XM(I,K)=A
      90 CONTINUE
      IF(NCYC.GT.0) GO TO 130
      C READ PLUG MASS INTO CORE.
      C (IF NPASS=0, DATA IS ON CARDS OTHERWISE, DATA IS ON TAPE.)
      C
      DO 100 I=1,3
      DO 100 J=1,3
      EMP(I,J)=O.O
      IF(J.EQ.I) EMP(I,J)=1.0
      100 CONTINUE
      C
      IF(NPASS.NE.0) GO TO 120
      C
      IF (IMASS.EQ.0) GO TO 105
      CALL NASTRD(IMASS,IMIN,2,4,1,NPGDOF,NPGDOF,EMP(1,1))
      DO 102 I=1,NPGDOF
      CALL NASTRD(IMASS,IMIN,2,4,2,NPGDOF,NPGDOF,EMP(1,1))
      102 CONTINUE
      GO TO 112
      105 READ (IMIN,9000) (NR(K),NC(K),WW(K),K=1,3)
      NCARD=0
      DO 110 K=1,3
      IF(NR(K).EQ.0) GO TO 110
      EMP(NR(K),NC(K))=WW(K)
      EMP(NC(K),NR(K))=WW(K)
      NCARD=NCARD+1
      110 CONTINUE

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SUBROUTINE FFFMASS    74/74    OPT=1

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```
CALL GETROW(IUMD,1,EMAS(J),NCOL)                                 59
J=+1
50 CONTINUE
CALL DCLOSE(IUMD)
C READ DYNAMIC LAMBDA MATRIX INTO CORE
C
65    IF (NCYC.GT.0) GO TO 69
      READ (IUCD,9004) NPGDOF
      NCOL = NDYDOF
      NROW = NPDDOF
      DO 60 I=1,NROW
      DO 55 J=1,NCOL
      ELAM(J,I) = 0.0
55    CONTINUE
60    CONTINUE
      ITRIN = 26
      IF (ITRNSF.EQ.2) ITRIN = 20
      IF (ITRNSF.EQ.0) GO TO 62
      IF (IDYFLX.EQ.0.AND.IMASS.EQ.0)
1CALL NASTRD(ITRNSF,ITRIN,1,3,1,NDYDOF,NPGDOF,ELAM(1,1))
      IF (IDYFLX.NE.0.OR.IMASS.NE.0)
1CALL NASTRD(ITRNSF,ITRIN,2,3,1,NDYDOF,NPGDOF,ELAM(1,1))
      DO 61 I=1,NPGDOF
      CALL NASTRD(ITRNSF,ITRIN,1,3,2,NDYDOF,NPGDOF,ELAM(1,1))
61    CONTINUE
      IF (ITRNSF.EQ.2)
1CALL NASTRD(ITRNSF,ITRIN,1,3,3,NDYDOF,NPGDOF,ELAM(1,1))
      GO TO 67
62    READ (ITRIN,9003) ((IROW(K),ICOL(K),ELAMIN(K)),K=1,3)
      DO 65 K=1,3
      I = IROW(K)
      IF (K.EQ.1.AND.I.EQ.0) GO TO 66
      IF (I.EQ.0) GO TO 65
      J = ICOL(K)
      ELAM(J,I) = ELAMIN(K)
65    CONTINUE
      GO TO 62
66    WRITE (6,9005) NPGDOF,NDYDOF
      DO 666 J=1,NPGDOF
      666 WRITE (6,9006) J,(ELAM(I,J),I=1,NDYDOF)
67    CONTINUE
      IFDLTI = 5
      IF (KLUSE.LE.0) IFDLTI = 2
      CALL PUDLAB (8HFFMASS02,IUDLTI,NAME2,IFDLTI,NROW,NCOL)
      DO 68 I=1,NROW
      CALL PUTROW (IUDLTI,-1,ELAM(1,I),NCOL)
68    CONTINUE
      CALL DCLOSE (IUDLTI)
      GO TO 72
69    CONTINUE
      CALL GEDLAB (8HFFMASS02,IUDLTI,NAME5,NROW,NCOL)
      DO 70 I=1,NROW
      CALL GETROW(IUDLTI,1,ELAM(1,I),NCOL)
70    CONTINUE
      CALL DCLOSE(IUDLTI)
71    CONTINUE
      FFFMASS    60
      FFFMASS    61
      FFFMASS    62
      FFFMASS    63
      FFFMASS    64
      FFFMASS    65
      FFFMASS    66
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      FFFMASS    109
      FFFMASS    110
      FFFMASS    111
      FFFMASS    112
      FFFMASS    113
      FFFMASS    114
      FFFMASS    115
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1      SUBROUTINE FFMASS(ELAM,ELTM,TPUG,BUFFER,IDXFLX,IMASS,
1                         ITRNSF,IMIN)
2
3      C THIS SUBROUTINE MODIFIES THE CANTILEVER MASS MATRIX,MD, AND CREATES
4      C A NEW MASS MATRIX,MDFF, FOR FREE-FREE VIBRATION ANALYSIS
5      C WHERE XM1= MD-(MD*LAMBDA)*XM1*(LAMBDA(TRAN)*MD*LAMBDA)+EMP
6      C
7      DIMENSION EMAS(1), ELAM(220,3), ELTM(3,220), TPUG(3,220), BUFFER(1)
8      DIMENSION NAME(2), XM(3,3), NR(3), NC(3), WW(3), XM1(3,3)
9      DIMENSION NAM(2), NAMFM(2)
10     DIMENSION ELAMIN(3), IROW(3), ICOL((3), NAME2(2))
11
12     COMMON /PLACES/ IWIN1,IWIN2,IUOUT1,IUOUT2,IUGO1,IUGO2,IUGO3,IUGO4,
13                      IUSCR,IFS3,IFS4,IUCD,IUPR,
14                      IUA,IFA,IUY,IFY,IUMEMN,IFMEMN,IUSTFN,IFSTFN,
15                      IUKS,IFKS,IUB,IFB,IUDESO,IFDESO,
16                      IUMDBI,IFMDBI,IUADDI,IFADDI,IUBALI,IFBALI,
17                      IUDEST,IUDESI,IUWTI,IUWTI,
18                      IUMEMD,IFMEMD,IUBT,IFBT,
19                      IUDEN,IUDESN,IUWD,IFWD,
20                      IUMEMF,IFMEMF,
21                      IUSTFO,IFSTFO,IUMDB,IFMDB,IUADD,IUADD,IUBAL,IUBAL,
22                      IUDESF,IFDESF,IUWT,IFWT,
23                      IUDUM1,IUDUM1,IUDUM2,IUDUM2,IUDUM3,IUDUM3,
24                      IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IUZR,IFLR,
25                      IUBR,IFBR,
26                      IUPHTF,IFPHTF,IUMODM,IFMODM,
27                      IUMODK,IFMODK,IUPHT,IFPH,IUQT,IFQT,IUQ,IFQ,
28                      IUPH,IFPH,IUINCW,IFINCM,IUINCK,IFINCK
29
30     COMMON /KLUES/ KLUSE,KLUNAL,IRED,KLUMD,KLUBAL,MSADD,NPASS,INDOPT,
31                      VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND,
32                      IFIN,KLUB,KLUO,MORBAL,DBAL
33
34     COMMON /PLAYFF/ IUMOFF,IFMDF,IFDLTI,IFDLTI,IUSLT1,IUSLT1
35                      ,IUMPL,IUMLPI,IUTPGT,IFPPGT,IUPATF,IFFPATF
36                      ,IUMPL,IUMLPI,IUSLT1,IUSLT1,IUDLT,IFDLT
37
38     COMMON /KLUFF/ KFREE
39
40     COMMON /PLUG/ EMP(3,3), PHP(3,40)
41     COMMON /CLIST/ KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE
42
43     COMMON /SIZES/ NSTMEM,NSTDOF,NDYDOF,NDESNO,NDESYS
44
45     COMMON /CLUEV/ LKLUVE,V,KLUVE(V20)
46
47
48     DATA NAM /4HTPLU,4HGT/, NAMFFM/4HMDFF,4H/
49
50     DATA NAME2 /4HDYNL,4HAMT/
51
52     CALL PROGNA(4H(FFM,4HASS))
53
54     CALL GEDLAB(8HFFMASS01,IUWD,NAME,IFMD,MROW,MCOL)
55
56
57
58

```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
222	146	J	122-124	2B	INSTACK
246		K	136-136	1B	EXT REFS
261	160	J	137-139	2B	EXT REFS NOT INNER
270		K	138-138	1B	EXT REFS
314	220	K	149-152	7B	EXT REFS
326	250	I	155-168	33B	NOT INNER
331	240	J	158-167	26B	NOT INNER
350	230	M	163-166	3B	INSTACK
367	300	K	173-176	10B	EXT REFS
MEMBERS - BIAS NAME(LENGTH)					
COMMON BLOCKS	CLIST	LENGTH	O KOUNT	(1)	1 KPAGE (1)
		11	3 LINEST	(1)	4 KLABEL (1)
			6 NPAGE	(1)	7 KBPAGE (1)
			9 KOUNTH	(1)	10 KOUNTI (1)
			O NUMSTR	(1)	1 KCONST (1)
STORES	277		32 IDYDOF	(30)	62 IDSTR (5)
			72 STRWO	(5)	77 STRWN (5)
			97 STRIO	(15)	112 STRIN (15)
			142 STRRO	(15)	157 STRRN (15)
			177 STRWDN	(5)	182 STRDO (15)
			212 STRRDO	(15)	227 STRRDN (15)
STRCLU	10		O ICYCLE	(1)	1 ISTEP (1)
			3 M2	(1)	4 M3 (1)
			6 VS	(1)	7 VOLD (1)
LOCSTR	6		9 STPOLD	(1)	8 VNEW (1)
COMRWP	3		O IUSTRI	(1)	1 IFSTRI (1)
			3 IFMREF	(1)	2 IUMOD (1)
			O ITAPER	(1)	1 ITAPEW (1)
STATISTICS					
PROGRAM LENGTH			1202B	642	2 IUMREF (1)
CM LABELED COMMON LENGTH			463B	307	5 IFMOD (1)
52000B CM USED					2 ITAEEP (1)

SUBROUTINE MASTOR			74/74 OPT1=1			FTN 4.8+577			85/01/23. 08.10.44			PAGE 6		
VARIABLES	SN	TYPE	RELOCATION			REFS	82	2*83	87	94	97	2*98	97	
567	Sy	REAL	DEFINED	64	REFS	DEFINED	81	2*83	85	2*88	96	97	97	
570	Sz	REAL	DEFINED	65	REFS	DEFINED	77	78	79	81	82	83	85	
10	VNEW	REAL	STRCLU	16	REFS	STRCLU	87	88	94	95	96	97	98	
7	VOLD	REAL	STRCLU	16	REFS	STRCLU	86	87	88	94	95	96	97	
6	VS	REAL	REFS	16	REFS	REFS	77	78	79	81	82	83	85	
562	w	REAL	REFS	16	REFS	REFS	87	88	94	95	96	97	98	
0	WORK	REAL	DEFINED	59	REFS	DEFINED	4	45	150	174	DEFINED	1	164	
563	XI	REAL	REFS	83	REFS	REFS	83	84	85	86	87	88	89	
564	YI	REAL	REFS	88	REFS	REFS	88	89	90	91	92	93	94	
565	ZI	REAL	REFS	98	REFS	REFS	98	99	100	101	102	103	104	
VARIABLES USED AS FILE NAMES. SEE ABOVE														
EXTERNALS			TYPE	ARGS	REFERENCES	REFERENCES	42	43	153	177				
DCLOSE			DCLOSE	1		DCLOSE	35	38						
GEDLAB			GEDLAB	6		GEDLAB	39	41						
GETROW			GETROW	4		GETROW	39	41						
MESSAGE			MESSAGE	3		MESSAGE	28	30						
PRMAT2			PRMAT2	8		PRMAT2	45	47						
PROGNA			PROGNA	2		PROGNA	27	29						
PUDLAB			PUDLAB	6		PUDLAB	36	38						
PUTROW			PUTROW	4		PUTROW	40	42						
TITLES			TITLES	1		TITLES	132	134						
STATEMENT LABELS			DEF LINE	REFERENCES	REFERENCES	REFERENCES	41	42						
0	50		0	38		0	51	52						
47	100		47	30		47	69	70						
0	120		0	66		0	103	104						
0	140		0	67		0	114	115						
0	144		0	101		0	114	115						
175	145		175	109		175	115	116						
0	146		0	109		0	124	125						
225	147		225	119		225	124	125						
0	160		0	137		0	139	140						
0	200		0	57		0	141	142						
0	220		0	149		0	152	153						
0	230		0	149		0	166	167						
0	240		0	158		0	167	168						
0	250		0	155		0	168	169						
0	300		0	173		0	176	177						
535	9000	FMT	535	134		535	180	181						
543	9001	FMT	543	134		543	181	182						
546	9002	FMT	546	136		546	182	183						
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	FROM-TO	LENGTH	PROPERTIES	FROM-TO	LENGTH	PROPERTIES	FROM-TO	LENGTH	PROPERTIES
24	50	I	38 41	128	EXT REFS	38 41	128	EXT REFS	38 41	128	EXT REFS	38 41	128	EXT REFS
50	200	I	57 141	240B	NOT INNER	57 141	240B	NOT INNER	57 141	240B	NOT INNER	57 141	240B	NOT INNER
64	120	J	66 69	148	INSTACK	66 69	148	INSTACK	66 69	148	INSTACK	66 69	148	INSTACK
72	120	K	67 69	28	INSTACK	67 69	28	INSTACK	67 69	28	INSTACK	67 69	28	INSTACK
127	140	J	100 103	21B	NOT INNER	100 103	21B	NOT INNER	100 103	21B	NOT INNER	100 103	21B	NOT INNER
141	140	K	101 103	3B	INSTACK	101 103	3B	INSTACK	101 103	3B	INSTACK	101 103	3B	INSTACK
152	145	J	108 115	26B	NOT INNER	108 115	26B	NOT INNER	108 115	26B	NOT INNER	108 115	26B	NOT INNER
172	144	L	112 114	28	INSTACK	112 114	28	INSTACK	112 114	28	INSTACK	112 114	28	INSTACK

SUBROUTINE MASTOR	74/74	OPT=1	RELOCATION	
VARIABLES	SN	TYPE		
7	KBPAGE	INTEGER	CLIST	DEFINED 123
560	KCOL	INTEGER	STORES	REFS 138
1	KCONST	INTEGER	CLIST	REFS 9
4	KLABEL	INTEGER	CLIST	REFS 35
0	KOUNT	INTEGER	CLIST	REFS 11
11	KOUNTH	INTEGER	CLIST	REFS 9
12	KOUNTI	INTEGER	CLIST	REFS 9
1	KPAGE	INTEGER	CLIST	REFS 9
557	KROW	INTEGER	CLIST	REFS 9
5	KTPAGE	INTEGER	CLIST	REFS 9
573	L	INTEGER	CLIST	2*113
576	L <sub>F</sub>	INTEGER	CLIST	164
2	LINES	INTEGER	CLIST	165
10	LINESG	INTEGER	CLIST	119
3	LINEST	INTEGER	CLIST	DEFINED 112
577	LS	INTEGER	CLIST	DEFINED 112
600	M	INTEGER	REFS 9	131
2	M1	INTEGER	STRCLU	REFS 9
3	M2	INTEGER	STRCLU	REFS 9
4	M3	INTEGER	STRCLU	REFS 9
5	M4	INTEGER	STRCLU	REFS 9
574	N	INTEGER	STRCLU	REFS 9
601	NAME	INTEGER	ARRAY	172
1067	NAMREF	INTEGER	ARRAY	REFS 4
1134	NAMUP	INTEGER	ARRAY	REFS 4
0	NCYC	INTEGER	F.P.	REFS 6
1071	NDOF	INTEGER	ARRAY	REFS 5
6	NPAGE	INTEGER	CLIST	REFS 9
0	NUMSTR	INTEGER	STORES	REFS 11
362	SCALE	REAL	STORES	REFS 11
603	STM	REAL	ARRAY	REFS 4
11	STPOLD	REAL	ARRAY	DEFINED 150
305	STRIDN	REAL	STRCLU	175
266	STRIDO	REAL	STORES	REFS 4
122	STRII	REAL	ARRAY	REFS 11
160	STRIN	REAL	ARRAY	REFS 11
141	STRIO	REAL	ARRAY	REFS 11
343	STRRDN	REAL	ARRAY	REFS 11
324	STRRDO	REAL	ARRAY	REFS 11
177	STRRI	REAL	ARRAY	REFS 11
235	STRRN	REAL	ARRAY	REFS 11
216	STRRO	REAL	ARRAY	REFS 11
261	STRWDN	REAL	ARRAY	REFS 11
254	STRWDO	REAL	ARRAY	REFS 11
103	STRWI	REAL	ARRAY	REFS 11
115	STRWN	REAL	ARRAY	REFS 11
110	STRWD	REAL	ARRAY	REFS 11
566	SX	REAL	STORES	REFS 86

DEFINED

SUBROUTINE MASTOR	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23.	08.10.44	PAGE	5
VARIABLES	SN	TYPE						
7	KBPAGE	INTEGER	CLIST	DEFINED 127	136	138	151	2*160
560	KCOL	INTEGER	STORES	REFS 138	101	107	113	117
1	KCONST	INTEGER	CLIST	REFS 9	159	173		175
4	KLABEL	INTEGER	CLIST	REFS 35				136
0	KOUNT	INTEGER	CLIST	REFS 11				120
11	KOUNTH	INTEGER	CLIST	REFS 9				170
12	KOUNTI	INTEGER	CLIST	REFS 9				
1	KPAGE	INTEGER	CLIST	REFS 9				
557	KROW	INTEGER	CLIST	REFS 9				
5	KTPAGE	INTEGER	CLIST	REFS 9				
573	L	INTEGER	CLIST	2*113				
576	L <sub>F</sub>	INTEGER	CLIST	164				
2	LINES	INTEGER	CLIST	165				
10	LINESG	INTEGER	CLIST	119				
3	LINEST	INTEGER	CLIST	DEFINED 112				
577	LS	INTEGER	CLIST	DEFINED 112				
600	M	INTEGER	REFS 9	131				
2	M1	INTEGER	STRCLU	REFS 9				
3	M2	INTEGER	STRCLU	REFS 9				
4	M3	INTEGER	STRCLU	REFS 9				
5	M4	INTEGER	STRCLU	REFS 9				
574	N	INTEGER	STRCLU	REFS 9				
601	NAME	INTEGER	ARRAY	172				
1067	NAMREF	INTEGER	ARRAY	REFS 4				
1134	NAMUP	INTEGER	ARRAY	REFS 4				
0	NCYC	INTEGER	F.P.	REFS 6				
1071	NDOF	INTEGER	ARRAY	REFS 5				
6	NPAGE	INTEGER	CLIST	REFS 9				
0	NUMSTR	INTEGER	STORES	REFS 11				
362	SCALE	REAL	STORES	REFS 11				
603	STM	REAL	ARRAY	REFS 4				
11	STPOLD	REAL	ARRAY	DEFINED 150				
305	STRIDN	REAL	STRCLU	175				
266	STRIDO	REAL	STORES	REFS 4				
122	STRII	REAL	ARRAY	REFS 11				
160	STRIN	REAL	ARRAY	REFS 11				
141	STRIO	REAL	ARRAY	REFS 11				
343	STRRDN	REAL	ARRAY	REFS 11				
324	STRRDO	REAL	ARRAY	REFS 11				
177	STRRI	REAL	ARRAY	REFS 11				
235	STRRN	REAL	ARRAY	REFS 11				
216	STRRO	REAL	ARRAY	REFS 11				
261	STRWDN	REAL	ARRAY	REFS 11				
254	STRWDO	REAL	ARRAY	REFS 11				
103	STRWI	REAL	ARRAY	REFS 11				
115	STRWN	REAL	ARRAY	REFS 11				
110	STRWD	REAL	ARRAY	REFS 11				
566	SX	REAL	STORES	REFS 86				

DEFINED

SUBROUTINE	MASTER	74/74	OPT=1	FTN 4.8+577	85/01/23	08.10.44
N=1						
DO 300 K=1,KROW						
CALL PUTROW(TUMD,1,WORK(N),K)						
N=N+K						
300 CONTINUE						
CALL DCLOSE(TUMD)						
C						
C						
9000 FORMAT(//,10X,32HNEW MASS MATRIX FOR STORE NUMBER,1X,14,.)						
9001 FORMAT(15X,6(5X,15.5X))						
9002 FORMAT(/,10X,15.1P6E15.5)						
C						
RETURN						
END						
185						
SYMBOLIC REFERENCE MAP (R=3)						
Y POINTS	DEF LINE	REFERENCES				
3 MASTOR	1	184				
TABLES	SN TYPE	RELOCATION				
0 BUFFER	REAL INTEGER	F.P.				
1	I					
REFS	40	39	40	DEFINED	1	
REFS	65	59	60	DEFINED	62	
REFS	85	68	77	DEFINED	175	
REFS	98	86	78	DEFINED	176	
REFS	2*102	87	88	DEFINED	177	
REFS	127	2*111	94	DEFINED	178	
REFS	134	109	95	DEFINED	179	
REFS	135	2*113	119	DEFINED	180	
REFS	136	138	111	DEFINED	181	
REFS	155	136	119	DEFINED	182	
REFS	16	138	119	DEFINED	183	
REFS	5	136	119	DEFINED	184	
REFS	11	134	119	DEFINED	185	
REFS	11	109	119	DEFINED	186	
REFS	35	170	111	DEFINED	187	
REFS	17	36	111	DEFINED	188	
REFS	17	36	119	DEFINED	189	
REFS	17	36	119	DEFINED	190	
REFS	11	24	119	DEFINED	191	
REFS	16	39	119	DEFINED	192	
REFS	19	39	119	DEFINED	193	
REFS	19	39	119	DEFINED	194	
REFS	19	39	119	DEFINED	195	
REFS	35	39	119	DEFINED	196	
REFS	1	42	119	DEFINED	197	
REFS	17	42	119	DEFINED	198	
REFS	17	42	119	DEFINED	199	
REFS	17	42	119	DEFINED	200	
REFS	17	42	119	DEFINED	201	
REFS	17	42	119	DEFINED	202	
REFS	17	42	119	DEFINED	203	
REFS	17	42	119	DEFINED	204	
REFS	17	42	119	DEFINED	205	
REFS	17	42	119	DEFINED	206	
REFS	17	42	119	DEFINED	207	
REFS	17	42	119	DEFINED	208	
REFS	17	42	119	DEFINED	209	
REFS	17	42	119	DEFINED	210	
REFS	17	42	119	DEFINED	211	
REFS	17	42	119	DEFINED	212	
REFS	17	42	119	DEFINED	213	
REFS	17	42	119	DEFINED	214	
REFS	17	42	119	DEFINED	215	
REFS	17	42	119	DEFINED	216	
REFS	17	42	119	DEFINED	217	
REFS	17	42	119	DEFINED	218	
REFS	17	42	119	DEFINED	219	
REFS	17	42	119	DEFINED	220	
REFS	17	42	119	DEFINED	221	
REFS	17	42	119	DEFINED	222	
REFS	17	42	119	DEFINED	223	
REFS	17	42	119	DEFINED	224	
REFS	17	42	119	DEFINED	225	
REFS	17	42	119	DEFINED	226	
REFS	17	42	119	DEFINED	227	
REFS	17	42	119	DEFINED	228	
REFS	17	42	119	DEFINED	229	
REFS	17	42	119	DEFINED	230	
REFS	17	42	119	DEFINED	231	
REFS	17	42	119	DEFINED	232	
REFS	17	42	119	DEFINED	233	
REFS	17	42	119	DEFINED	234	
REFS	17	42	119	DEFINED	235	
REFS	17	42	119	DEFINED	236	
REFS	17	42	119	DEFINED	237	
REFS	17	42	119	DEFINED	238	
REFS	17	42	119	DEFINED	239	
REFS	17	42	119	DEFINED	240	
REFS	17	42	119	DEFINED	241	
REFS	17	42	119	DEFINED	242	
REFS	17	42	119	DEFINED	243	
REFS	17	42	119	DEFINED	244	
REFS	17	42	119	DEFINED	245	
REFS	17	42	119	DEFINED	246	
REFS	17	42	119	DEFINED	247	
REFS	17	42	119	DEFINED	248	
REFS	17	42	119	DEFINED	249	
REFS	17	42	119	DEFINED	250	
REFS	17	42	119	DEFINED	251	
REFS	17	42	119	DEFINED	252	
REFS	17	42	119	DEFINED	253	
REFS	17	42	119	DEFINED	254	
REFS	17	42	119	DEFINED	255	
REFS	17	42	119	DEFINED	256	
REFS	17	42	119	DEFINED	257	
REFS	17	42	119	DEFINED	258	
REFS	17	42	119	DEFINED	259	
REFS	17	42	119	DEFINED	260	
REFS	17	42	119	DEFINED	261	
REFS	17	42	119	DEFINED	262	
REFS	17	42	119	DEFINED	263	
REFS	17	42	119	DEFINED	264	
REFS	17	42	119	DEFINED	265	
REFS	17	42	119	DEFINED	266	
REFS	17	42	119	DEFINED	267	
REFS	17	42	119	DEFINED	268	
REFS	17	42	119	DEFINED	269	
REFS	17	42	119	DEFINED	270	
REFS	17	42	119	DEFINED	271	
REFS	17	42	119	DEFINED	272	
REFS	17	42	119	DEFINED	273	
REFS	17	42	119	DEFINED	274	
REFS	17	42	119	DEFINED	275	
REFS	17	42	119	DEFINED	276	
REFS	17	42	119	DEFINED	277	
REFS	17	42	119	DEFINED	278	
REFS	17	42	119	DEFINED	279	
REFS	17	42	119	DEFINED	280	
REFS	17	42	119	DEFINED	281	
REFS	17	42	119	DEFINED	282	
REFS	17	42	119	DEFINED	283	
REFS	17	42	119	DEFINED	284	
REFS	17	42	119	DEFINED	285	
REFS	17	42	119	DEFINED	286	
REFS	17	42	119	DEFINED	287	
REFS	17	42	119	DEFINED	288	
REFS	17	42	119	DEFINED	289	
REFS	17	42	119	DEFINED	290	
REFS	17	42	119	DEFINED	291	
REFS	17	42	119	DEFINED	292	
REFS	17	42	119	DEFINED	293	
REFS	17	42	119	DEFINED	294	
REFS	17	42	119	DEFINED	295	
REFS	17	42	119	DEFINED	296	
REFS	17	42	119	DEFINED	297	
REFS	17	42	119	DEFINED	298	
REFS	17	42	119	DEFINED	299	
REFS	17	42	119	DEFINED	300	

SUBROUTINE MASTOR 74/74 OPT=1

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```
115      145 CONTINUE
C       K = 0
DO 147 L=1,6
IF (IDYDOF(I,L).EQ.0) GO TO 147
K = K+1
IDDOF(I,K) = IDYDOF(I,L)
DO 146 J=1,6
STM(I,J,K) = STM(I,J,L)
146 CONTINUE
147 CONTINUE
C       NDOF(I)=K
C       LIST STORE MASS MATRICES.
C       KOUNT=LINES
CALL TITLES(2)
C       WRITE(IUPR,9000) IDSTR(I)
L=NDOF(I)
WRITE(IUPR,9001) (IDDOF(I,K),K=1,L)
DO 160 J=1,L
WRITE(IUPR,9002) IDDOF(I,J),(STM(I,J,K),K=1,L)
160 CONTINUE
C       200 CONTINUE
C       1. READ REFERENCE MASS MATRIX BACK INTO CORE.
C       2. REPLACE STORE MASS MATRIX BY NEW VALUES
C       3. WRITE UPDATED MASS MATRIX BACK ONTO STANDARD LOCATION.
C
CALL GEDLAB(BHMASTOR02,IUMREF,NAME,IFMREF,KROW,KCOL)
N=1
DO 220 K=1,KROW
CALL GETROW(IUMREF,1,WORK(N),KCOL)
N=N+K
220 CONTINUE
CALL DCLOSE(IUMREF)
C
DO 250 I=1,NUMSTR
C       JJ=NDOF(I)
DO 240 J=1,JJ
K=IDDOF(I,J)
LF=(K+1)*K/2
LS=LF-J+1
L=LS
DO 230 M=1,J
WORK(L)= STM(I,J,M)
L=L+1
230 CONTINUE
240 CONTINUE
250 CONTINUE
C
CALL PUDLAB(BHMASTOR02,IUMD,NAMUP,IFMD,KROW,KCOL)
C
```

```

C
  W = STRWN(1)
  XI= STRIN(1,1)
  YI= STRIN(1,2)
  ZI= STRIN(1,3)
  SX= STRRN(1,1)
  SY= STRRN(1,2)
  SZ= STRRN(1,3)
DO 120 J=1,6
DO 120 K=1,6
  STM(I,J,K)=0.0
120 CONTINUE
C CURRENT EQUATIONS FOR STORE MASS MATRIX ARE BASED ON RIGHT-HAND
C COORDINATE SYSTEM.
C ORIGINAL EQUATIONS, TAKEN FROM GAC REPORT ADCR-80-1, ARE
C RETAINED AS COMMENTS.
C
STM(I,1,1)=W
STM(I,2,2)=W
STM(I,3,3)=W
C
STM(I,4,2)=-W*SZ
STM(I,4,3)= W*SY
STM(I,4,4)=XI+W*(SY*SY+SZ*SZ)
C
STM(I,5,1)= W*SZ
STM(I,5,3)=-W*SX
STM(I,5,4)=-W*SX*SY
STM(I,5,5)=YI+W*(SZ*SZ+SX*SX)
C
STM(I,6,1)= W*SY
STM(I,6,2)=-W*SX
STM(I,6,4)= W*SX*SZ
STM(I,6,5)= W*SY*SZ
STM(I,6,1)=-W*SY
STM(I,6,2)= W*SX
STM(I,6,4)=-W*SX*SZ
STM(I,6,5)=-W*SY*SZ
STM(I,6,6)=ZI+W*(SX*SX+SY*SY)
C
DO 140 J=1,6
DO 140 K=1,J
  STM(I,K,J)=STM(I,J,K)
140 CONTINUE
C CONTRACT STORE MASS MATRICES
C
K=0
DO 145 J=1,6
  IF(IDYDOF(I,J).EQ.0) GO TO 145
  K=K+1
  IDDOF(I,K)=IDYDOF(I,J)
  DO 144 L=1,6
    STM(I,K,L)=STM(I,J,L)
144 CONTINUE

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SUBROUTINE MASTOR 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 1

```

1      C          SUBROUTINE MASTOR(WORK,BUFFER,IUMD,IFMD,NCYC)
2      C
3      C          DIMENSION WORK(1),BUFFER(1),NAME(2),STM(5,6,6),NAMREF(2)
4      C          DIMENSION NDUF(5),IDDOF(5,6)
5      C          DIMENSION NAMUP(2)
6      C
7      C          COMMON /CLIST/ KOUNT,KPAGE,LINES,KLABEL,KOUNTI
8      C          COMMON /STORES/ NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)
9      C          A      STRWI(5),STRWD(5),STRMN(5),STRRI(5,3),STRI(5,3),IDSTR(5,3)
10     C          B      STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)
11     C          C      STRWD(5),STRWN(5),STRDO(5,3),STRDN(5,3)
12     C          D      STRDO(5,3),STRDN(5,3),SCALE(5,7)
13     C          COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD
14     C          COMMON /LOCSTR/ IUSTRI,IFSTR,IUMREF,IFMREF
15     C          1      IUMD,IFMD
16     C          COMMON /COMRWP/ ITAPER,ITAPEW
17     C          1      IUPR=ITAPEW
18     C          DATA NAMUP /4HUPDA,4HTEMD/
19     C          DATA NAMREF /4HREF ,4HMASS/
20     C
21     C          1      IUPR=ITAPEW
22     C
23     C          CALL PROGNA(4H(MAS,4HTOR)
24     C          CALL MESSAGE(1,6,6,MASTER)
25     C
26     C          IF(NCYC.GT.0) GO TO 100
27     C
28     C          TRANSFER REFERENCE DYNAMIC MASS MATRIX TO NEW UNIT. THIS MATRIX DOES
29     C          NOT INCLUDE ANY STORE REDESIGN.
30     C
31     C          CALL GEDLAB(BHMASTER01,IUMD,NAME,IFMD,KROW,KCOL)
32     C          CALL PUDLAB(BHMASTER01,IUMREF,NAMREF,IFMREF,KROW,KCOL)
33     C
34     C          DO 50 I=1,KROW
35     C          CALL GETROW(IUMD,1,BUFFER,KCOL)
36     C          CALL PUTROW(IUMREF,1,BUFFER,I)
37     C
38     C          50 CONTINUE
39     C          CALL DCLOSE(IUMD)
40     C          CALL DCLOSE(IUMREF)
41     C
42     C          CALL PRMAT2(IUMREF,IFMREF,WORK,1,IUPR,4,81,
43     C          1      81H (DYNAMIC MASS MATRIX ENTERING CURRENT FOP RUN - DOES NOT REFL
44     C          2ECT STORE REDESIGN)
45     C
46     C          CALL PROGNA(4H(MAS,4HTOR))
47     C
48     C          50 CONTINUE
49     C
50     C          COMPUTE NEW MASS MATRIX FOR EACH STORE (6X6)
51     C
52     C          DO 200 I=1,NUMSTR
53     C
54     C          200 CONTINUE
55     C
56     C
57     C
58     C

```

COMMON BLOCKS		LENGTH	MEMBERS - BIAS NAME(LENGTH)			FTN 4.8+577	85/01/23 . 08.10.44	PAGE	21
FILE	20		3 NINOPT	(1)		4 NDESN0	(1)		5 NDESYS (1)
WAYTS	6		0 IPPOS	(20)		1 WST	(1)		2 WMB (1)
CLIST	11		0 WINITT	(1)		4 WPRES	(1)		5 DW (1)
			3 WBO1H	(1)		1 KPAGE	(1)		2 LINES (1)
			0 KOUNT	(1)		4 KLABEL	(1)		5 KTPAGE (1)
			3 LINEST	(1)		7 KBPAGE	(1)		8 LINESG (1)
			6 NPAGE	(1)		10 KOUNTI	(1)		
			9 KOUNTH	(1)		1 KLUEV	(20)		
			0 LKLUEV	(1)					
EQUIV CLASSES	21		MEMBERS - BIAS NAME(LENGTH)						
PAK	20		0 JPAK	(20)					
ADDMS	550		0 NMS	(1)					
STATISTICS						1 JCHART	(3)		
PROGRAM LENGTH			2412B	1290					
CM LABELED COMMON LENGTH			706B	454					
52000B CM USED									

1 CHART (3)

SUBROUTINE	DYNMAS	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE	20
COMMON BLOCKS	BAL	LENGTH 241	MEMBERS - BIAS NAME(LENGTH)				
O	NMBAL	(1)	1 IDBAL (20)	21 VMBIN (20)			
41	VMBOLD	(20)	61 VMBNEW (20)	81 MBDDF (60)			
141	DRVMB	(20)	161 DRVMB0 (20)	181 S1MB (20)			
201	S2MB	(20)	221 S3MB (20)				
PLACES	98	O IUIN1 (1)	1 IUIN2 (1)	2 IUOUT1 (1)			
		3 IUOUT2 (1)	4 IUGO1 (1)	5 IUGO2 (1)			
		6 IUGO3 (1)	7 IUGO4 (1)	8 IUSCR (1)			
		9 IFSCR (1)	10 IFS1 (1)	11 IF52 (1)			
		12 IF53 (1)	13 IFS4 (1)	14 IUCD (1)			
		15 IUPR (1)	16 IUA (1)	17 IFA (1)			
		18 IUY (1)	19 IFY (1)	20 IUMENN (1)			
		21 IFMEMN (1)	22 IUSTFN (1)	23 IFSTFN (1)			
		24 IUKS (1)	25 IFKS (1)	26 IUB (1)			
		27 IFB (1)	28 IUDESO (1)	29 IFDESO (1)			
		30 IUMDBI (1)	31 IFMDBI (1)	32 IUADDI (1)			
		33 IFADDI (1)	34 IUBALI (1)	35 IFBALI (1)			
		36 IUDESI (1)	37 IFDESI (1)	38 IUTWTI (1)			
		39 IFWTI (1)	40 IUMEMO (1)	41 IFMEMO (1)			
		42 IUBT (1)	43 IFBT (1)	44 IUDESN (1)			
		45 IFDESN (1)	46 IUMD (1)	47 IFMD (1)			
		48 IUMEMF (1)	49 IFMEMF (1)	50 IUSTFO (1)			
		51 IFSTFO (1)	52 IUMDB (1)	53 IFMDB (1)			
		54 IUADD (1)	55 IFADD (1)	56 IUBAL (1)			
		57 IFBAL (1)	58 IUDESF (1)	59 IFDEF (1)			
		60 IUWT (1)	61 IFWT (1)	62 IUDUN1 (1)			
		63 IFDUM1 (1)	64 IUDUM2 (1)	65 IFDUM2 (1)			
		66 IUDUM3 (1)	67 IFDUM3 (1)	68 IUL (1)			
		69 IFL (1)	70 IUYT (1)	71 IFYT (1)			
		72 IIZ (1)	73 IFZ (1)	74 IUZR (1)			
		75 IFZR (1)	76 IULR (1)	77 IFLR (1)			
		78 IUBR (1)	79 IFBR (1)	80 IUPHTF (1)			
		81 IFPHTF (1)	82 IUMODM (1)	83 IFMODM (1)			
		84 IUMODK (1)	85 IFMODK (1)	86 IUPHT (1)			
		87 IFPHT (1)	88 IUQT (1)	89 IFQQT (1)			
		90 IUQ (1)	91 IFQ (1)	92 IUPH (1)			
		93 IFPH (1)	94 IWINCM (1)	95 IFINCM (1)			
		96 IWINCK (1)	97 IWINCK (1)				
		O IUMDFF (1)	1 IFMDFF (1)	2 IUDLTI (1)			
		3 IFDLTI (1)	4 IUSLTI (1)	5 IFSLTI (1)			
		6 IUMPLI (1)	7 IFMPLI (1)	8 IUTPGT (1)			
		9 IFTPGT (1)	10 IUPATF (1)	11 IFPATF (1)			
		12 IUMPL (1)	13 IFMPL (1)	14 IUSLT (1)			
		15 IFSLT (1)	16 IUDLT (1)	17 IFDLT (1)			
		18 IUQA (1)	19 IFQA (1)	20 IUGAT (1)			
		21 IFQAT (1)	22 IUPHA (1)	23 IFPHA (1)			
		24 IUPHAT (1)	25 IFPHAT (1)				
		O KLUSE (1)	1 KLUNAL (1)	2 IRED (1)			
		3 KLUMLD (1)	4 KLUBAL (1)	5 MSADD (1)			
		6 NPASS (1)	7 IDNOPT (1)	8 VDES (1)			
		9 EPS1 (1)	10 DWMAX (1)	11 NBAR (1)			
		12 NFIX (1)	13 D (1)	14 DEL (1)			
		15 EPS2 (1)	16 NCYC (1)	17 NNN (1)			
		18 IBAND (1)	19 IFIN (1)	20 KLUB (1)			
		21 KLUQ (1)	22 MORBAL (1)	23 DBAL (1)			
KLUFF	1	O KFREE (1)	1 NSTDOF (1)	2 NDYDOF (1)			
SIZES	6	O NSTHEM (1)					

SUBROUTINE DYNMAS			74/74	OPT=1			FTN 4.8+577	85/01/23. 08.10.44	PAGE 19
EXTERNALS	TYPE	ARGS	REFERENCES		REFERENCES		REFERENCES	REFERENCES	
PUTROW		4	163	164	177		100	109	
TIMEB		2	56	746			116	123	
TITLES		1	205				124	130	
STATEMENT	LABELS		DEF LINE	REFERENCES			130	135	
32	60		105	133			135	137	
54	70		116	134			137	140	
0	80		124	140			140	142	
77	85		130	140			142	144	
0	90		135	140			144	146	
125	100		135	140			146	148	
126	110		137	140			148	150	
0	115		139	142			150	152	
0	120		140	144			152	155	
146	130		140	146			155	158	
163	140		140	150			158	160	
167	150		142	160			160	162	
0	160		144	160			162	164	
214	170		144	160			164	166	
240	180		144	160			166	168	
247	210		144	160			168	170	
251	212		144	160			170	172	
253	213		144	160			172	174	
255	214		144	160			174	176	
256	220		144	160			176	178	
643	9001	FMT	NO REFS	130			178	180	
646	9002	FMT	NO REFS	130			180	182	
650	9003	FMT	NO REFS	130			182	184	
663	9004	FMT	NO REFS	130			184	186	
730	9005	FMT	NO REFS	130			186	188	
746	9006	FMT	NO REFS	130			188	190	
751	9007	FMT	NO REFS	130			190	192	
763	9008	FMT	NO REFS	130			192	194	
766	9009	FMT	NO REFS	130			194	196	
777	9010	FMT	NO REFS	130			196	198	
1014	9011	FMT	NO REFS	130			198	200	
1037	9012	FMT	NO REFS	130			200	202	
1061	9013	FMT	NO REFS	130			202	204	
1075	9014	FMT	NO REFS	130			204	206	
1103	9015	FMT	NO REFS	130			206	208	
1117	9016	FMT	NO REFS	130			208	210	
320	9940			130			210	212	
345	9950			130			212	214	
356	9970			130			214	216	
362	9980			130			216	218	
365	9990			130			218	220	
301	9999			130			220	222	
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		EXT REFS	EXITS	NOT INNER
64	160	I	120 168	120B					
71	80	J	123 124	2B	INSTACK				
102	90	K	130 130	12B			EXT REFS		
120	120	K	133 135	5B	INSTACK		EXITS		
130	120	K	139 151	15B	OPT		EXITS		
265		M	206 206	12B			EXT REFS		

SUBROUTINE	DYNMAS	74/74	OPT=1	RELOCATION	REFS	5	99	DEFINED	50	50
VARIABLES	SN	TYPE	*UNDEF	REFS	5	102	103	DEFINED	50	50
2263	NAME	INTEGER	ARRAY	REFS	5	102	103	DEFINED	50	50
2265	NAMMD	INTEGER	ARRAY	REFS	5	102	103	DEFINED	50	50
2267	NAMMB	INTEGER	ARRAY	REFS	6	102	103	DEFINED	50	50
2277	NAMMS	INTEGER	ARRAY	REFS	39	142	206	DEFINED	130	135
13	NBAR	INTEGER	ARRAY	REFS	39	137	139	DEFINED	132	135
2255	NC	INTEGER	ARRAY	REFS	712	711	711	DEFINED	132	135
1147	NCARD	INTEGER	ARRAY	REFS	39	61	711	DEFINED	132	135
1155	NCIC	INTEGER	ARRAY	REFS	43	2*99	2*102	DEFINED	132	135
20	NCYC	INTEGER	ARRAY	REFS	43	2*170	173	DEFINED	132	135
4	NDESNO	INTEGER	ARRAY	REFS	120	2*161	2*170	DEFINED	132	135
5	NDESYS	INTEGER	ARRAY	REFS	43	2*102	2*103	DEFINED	132	135
2	NDYDOF	INTEGER	ARRAY	REFS	43	2*110	2*112	DEFINED	132	135
14	NFIX	INTEGER	ARRAY	REFS	39	142	206	DEFINED	130	135
0	NMBAL	INTEGER	ARRAY	REFS	15	137	139	DEFINED	132	135
1204	NMS	INTEGER	*UNDEF	REFS	12	137	139	DEFINED	132	135
21	NNN	INTEGER	ARRAY	REFS	39	43	43	DEFINED	132	135
3	NNOPT	INTEGER	ARRAY	REFS	43	46	46	DEFINED	132	135
6	NPAGE	INTEGER	ARRAY	REFS	39	734	734	DEFINED	132	135
6	NPASS	INTEGER	ARRAY	REFS	4	134	140	DEFINED	132	135
2252	NR	INTEGER	ARRAY	REFS	43	134	140	DEFINED	132	135
1	NSTD0F	INTEGER	ARRAY	REFS	43	134	140	DEFINED	132	135
0	NSTMEM	INTEGER	*UNDEF	REFS	43	134	140	DEFINED	132	135
2301	NUMB	INTEGER	*UNDEF	REFS	43	134	140	DEFINED	132	135
1160	PAK	REAL	REAL	REFS	10	9	13	DEFINED	132	135
265	S1MB	REAL	REAL	REFS	15	15	15	DEFINED	132	135
311	S2MB	REAL	REAL	REFS	15	15	15	DEFINED	132	135
335	S3MB	REAL	REAL	REFS	15	15	15	DEFINED	132	135
2313	VALUF	REAL	REAL	REFS	10	10	10	DEFINED	132	135
10	VDES	REAL	REAL	REFS	39	134	140	DEFINED	132	135
25	VMBIN	REAL	REAL	REFS	15	15	15	DEFINED	132	135
75	VMBNEW	REAL	REAL	REFS	15	15	15	DEFINED	132	135
51	VMBOLD	REAL	REAL	REFS	15	15	15	DEFINED	132	135
3	WBOTH	REAL	REAL	REFS	45	45	45	DEFINED	132	135
0	WINITT	REAL	REAL	REFS	45	45	45	DEFINED	132	135
2	WMB	REAL	REAL	REFS	45	45	45	DEFINED	132	135
0	WORK	REAL	REAL	REFS	4	712	4*722	DEFINED	132	135
4	WPRES	REAL	REAL	REFS	45	45	45	DEFINED	132	135
1	WST	REAL	REAL	REFS	45	45	45	DEFINED	132	135
2260	WW	REAL	REAL	REFS	4	149	206	DEFINED	132	135
FILE NAMES	TAPE6	MODE	FMT	REFERENCES	117	158	175	SEE ABOVE		
VARIABLES USED AS FILE NAMES,				WRITES	117	158	175			
EXTERNALS	DCLOSE	TYPE	ARGS	REFERENCES	179	180				
	FFMASS			179	180					
	MASTER			722	722					
	MESSAGE			712	712					
	NASTRO			55	55					
	PRMAT1			110	110					
	PRMAT2			736	736					
	PROGNA			739	739					
	PUDLAB			54	54					
				102	102					
				103	103					

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5 FTN 4.8+577 85/01/23. 08. 10. 44
6 SUBROUTINE FFFMASS 74/74 OPT=1

          IF(NCARD.GT.0) GO TO 105
105      112 CONTINUE
          C
          KOUNT=LINES
          CALL TITLES(2)
          WRITE(IUPR,9001)
          KOUNT=KOUNT+5
          DO 115 I=1,LCOL
          WRITE(IUPR,9002) (I,J,EMP(I,J),J=1,LCOL)
          KOUNT=KOUNT+2
          115 CONTINUE
          C
          GO TO 130
130      120 CONTINUE
          CALL GEDLAB(8HFFMASS03,IUMPLI,NAME,IFMPLI,KROW,KCOL)
          NBYTE=(3*3)*4
          CALL DREAD(IUMPLI,EMP(1,1),NBYTE)
          CALL DCLOSE(IUMPLI)
          C
          130 CONTINUE
          C
          ADD (EMP) TO (XM) AND INVERT THE RESULT. STORE RESULT IN XM1.
          C
          DO 140 I=1,3
          DO 140 J=1,3
          140 XM(I,J)=XM(I,J)+EMP(I,J)
          C
          CALL IV33(XM,XM1)
          C
          FORM THE PRODUCT OF XM1 AND LAMBDA(TRAN)*MD. STORE RESULT IN TPLUG.
          C ALSO. STORE TPLUG(TRAN) ON I/O UNIT
          C
          DO 150 I=1,LCOL
          DO 150 K=1,MCOL
          A=0.0
          DO 145 J=1,LCOL
          A=A+XM(I,J)*ELTMD(J,K)
          145 CONTINUE
          TPLUG(I,K)=A
          150 CONTINUE
          C
          CALL PUDLAB(8HFFMASS01,IUTPGT,NAM,IFTPGT,MCOL,LCOL)
          DO 160 K=1,MCOL
          CALL PUTROW(IUTPGT,2,TPLUG(1,K),LCOL)
          160 CONTINUE
          CALL DCLOSE(IUTPGT)
          C
          FORM FREE-FREE MASS MATRIX (MDFF) AND STORE LOWER TRIANGLE ON I/O UNIT
          DO 190 I=1,MCOL
          L=((I-1)*1/2)+K
          A=0.0
          DO 170 J=1,LCOL
          A=A+ELTMD(J,I)*TPLUG(J,K)
          170 CONTINUE
          CALL PUDLAB(8HFFMASS02,IUMDFF,NAMFF,IFMDFF,MROW,MCOL)
          DO 180 K=1,1
          180
          C
          173 FFFMASS
          174 FFFMASS
          175 FFFMASS
          176 FFFMASS
          177 FFFMASS
          178 FFFMASS
          179 FFFMASS
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          225 FFFMASS
          226 FFFMASS
          227 FFFMASS
          228 FFFMASS
          229 FFFMASS

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      SUBROUTINE FFMASS   74/74   QPT=1

230          170 CONTINUE
                  BUFFER(K)=EMAS(L)-A
180          170 CONTINUE
                  CALL PUTROW(IUMDFF,
190          170 CONTINUE
                  CALL DCLOSE(IUMDFF)

235          C           C
                  9000 FORMAT(3(2I4,E15.5,
9001 FORMAT(//,10X,     16H
                  //,10X,     3(25H
9002 FORMAT(//,10X,     3(215,
9003 FORMAT(3(2I4,1PE15
9004 FORMAT(4I5)
9005 FORMAT(1H1,9X,BHRE
                  1      52H RIGID-B
9006 FORMAT(//15X,4HROW
                  C           RETURN
                  END

      SYMBOLIC REFERENCE MAP (R=3)

      ENTRY POINTS      DEF LINE      REFERENCES
      3 FFMASS          1             247
      VARIABLES        SN TYPE      RELOCATION
      1175 A           REAL         ARRAY
      0 BUFFER         REAL         ARRAY
      15 D             REAL         ARRAY
      27 DBAL          REAL         ARRAY
      16 DEL            REAL         ARRAY
      12 DMAX          REAL         ARRAY
      0 ELAM           REAL         ARRAY
      1244 ELAMIN       REAL         ARRAY
      0 ELTMD          REAL         ARRAY
      0 EMAS           REAL         ARRAY
      0 EMP            REAL         ARRAY
      11 EPS1          REAL         ARRAY
      17 EPS2          REAL         ARRAY
      1165 I            INTEGER      ARRAY

      22 IBAND          INTEGER      KLUES
      252 ICOL           INTEGER      KLUES
      7 INCDOT          INTEGER      KLUES

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5X),./)

COMMON CARD-IMAGE !

128	1		
122	1		
232	DEFIN		
77			
141	DEFIN		
93	DEFIN		
141	20		
58	1		
159	1		
153	1		
71			
126	1		
2*180	3*		
DEFINED			
120	1		
223			
92	DEFIN		

SUBROUTINE	FFMASS	74/74	OPT=1	RELOCATION
VARIABLES	SN	TYPE		F.P.
O	IDYFLX	INTEGER		PLACES
21	IFA	INTEGER		REFS
67	IFADD	INTEGER		REFS
41	IFADDI	INTEGER		REFS
33	IFB	INTEGER		REFS
71	IFBAL	INTEGER		REFS
43	IFBALI	INTEGER		REFS
117	IFBRI	INTEGER		REFS
53	IFBT	INTEGER		REFS
73	IFDESF	INTEGER		REFS
45	IFDESI	INTEGER		REFS
55	IFDESN	INTEGER		REFS
35	IFDESO	INTEGER		REFS
21	IFDLT	INTEGER		PLAYFF
3	IFDLTI	INTEGER		PLAYFF
77	IFDUM1	INTEGER		PLACES
101	IFDUM2	INTEGER		PLACES
103	IFDUM3	INTEGER		PLACES
23	IFIN	INTEGER		KLUES
141	IFINCK	INTEGER		PLACES
137	IFINCM	INTEGER		PLACES
31	IFKS	INTEGER		PLACES
105	IFL	INTEGER		PLACES
115	IFLR	INTEGER		PLACES
57	IFMD	INTEGER		PLACES
65	IFMDB	INTEGER		PLACES
37	IFMDBI	INTEGER		PLAYFF
1	IFMDFF	INTEGER		PLACES
61	IFMEMF	INTEGER		PLACES
25	IFMEMN	INTEGER		PLACES
51	IFMEMO	INTEGER		PLACES
125	IFMODK	INTEGER		PLACES
123	IFMODM	INTEGER		PLACES
15	IFMPL	INTEGER		PLAYFF
7	IFMLI	INTEGER		PLAYFF
13	IFPAIF	INTEGER		PLAYFF
135	IFPH	INTEGER		PLACES
27	IFPHA	INTEGER		PLAYFF
31	IFPHAT	INTEGER		PLAYFF
127	IFPHT	INTEGER		PLAYFF
121	IFPHTF	INTEGER		PLACES
133	IFQ	INTEGER		PLAYFF
23	IFOA	INTEGER		PLAYFF
25	IFQAT	INTEGER		PLAYFF
131	IFQT	INTEGER		PLACES
11	IFSCR	INTEGER		PLACES
17	IFSLT	INTEGER		PLAYFF
5	IFSLT1	INTEGER		PLAYFF
27	IFSTFN	INTEGER		PLAYFF
63	IFSTFO	INTEGER		PLAYFF
12	IFS1	INTEGER		PLACES
13	IFS2	INTEGER		PLACES
14	IFS3	INTEGER		PLACES
15	IFS4	INTEGER		PLACES
11	IFTPGT	INTEGER		PLAYFF
75	IFWT	INTEGER		PLACES

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SUBROUTINE	FFMASS	74/74	OPT=1	RELOCATION
VARIABLES	SN	TYPE		F.P.
O	IDYFLX	INTEGER		PLACES
21	IFA	INTEGER		REFS
67	IFADD	INTEGER		REFS
41	IFADDI	INTEGER		REFS
33	IFB	INTEGER		REFS
71	IFBAL	INTEGER		REFS
43	IFBALI	INTEGER		REFS
117	IFBRI	INTEGER		REFS
53	IFBT	INTEGER		REFS
73	IFDESF	INTEGER		REFS
45	IFDESI	INTEGER		REFS
55	IFDESN	INTEGER		REFS
35	IFDESO	INTEGER		REFS
21	IFDLT	INTEGER		PLAYFF
3	IFDLTI	INTEGER		PLAYFF
77	IFDUM1	INTEGER		PLACES
101	IFDUM2	INTEGER		PLACES
103	IFDUM3	INTEGER		PLACES
23	IFIN	INTEGER		KLUES
141	IFINCK	INTEGER		PLACES
137	IFINCM	INTEGER		PLACES
31	IFKS	INTEGER		PLACES
105	IFL	INTEGER		PLACES
115	IFLR	INTEGER		PLACES
57	IFMD	INTEGER		PLACES
65	IFMDB	INTEGER		PLACES
37	IFMDBI	INTEGER		PLAYFF
1	IFMDFF	INTEGER		PLACES
61	IFMEMF	INTEGER		PLACES
25	IFMEMN	INTEGER		PLACES
51	IFMEMO	INTEGER		PLACES
125	IFMODK	INTEGER		PLACES
123	IFMODM	INTEGER		PLACES
15	IFMPL	INTEGER		PLAYFF
7	IFMLI	INTEGER		PLAYFF
13	IFPAIF	INTEGER		PLAYFF
135	IFPH	INTEGER		PLACES
27	IFPHA	INTEGER		PLAYFF
31	IFPHAT	INTEGER		PLAYFF
127	IFPHT	INTEGER		PLAYFF
121	IFPHTF	INTEGER		PLACES
133	IFQ	INTEGER		PLAYFF
23	IFOA	INTEGER		PLAYFF
25	IFQAT	INTEGER		PLAYFF
131	IFQT	INTEGER		PLACES
11	IFSCR	INTEGER		PLACES
17	IFSLT	INTEGER		PLAYFF
5	IFSLT1	INTEGER		PLAYFF
27	IFSTFN	INTEGER		PLAYFF
63	IFSTFO	INTEGER		PLAYFF
12	IFS1	INTEGER		PLACES
13	IFS2	INTEGER		PLACES
14	IFS3	INTEGER		PLACES
15	IFS4	INTEGER		PLACES
11	IFTPGT	INTEGER		PLAYFF
75	IFWT	INTEGER		PLACES

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SUBROUTINE	FFMASS	74/74	OPT=1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	7
VARIABLES	SN	TYPE	RELOCATION					
23	IFY	INTEGER	PLACES	REFS	16			
107	IFYT	INTEGER	PLACES	REFS	16			
111	IFZ	INTEGER	PLACES	REFS	16			
113	IFZR	INTEGER	PLACES	REFS	16			
0	IMASS	INTEGER	F.P.	REFS	77			
0	IMIN	INTEGER	F.P.	REFS	159			
2	IRED	INTEGER	KLUES	REFS	33			
1247	IROW	INTEGER	ARRAY	REFS	14			
1171	ITRIN	INTEGER		REFS	77			
0	ITRNSF	INTEGER		I/O REF'S	87			
20	IUA	INTEGER		REFS	75			
66	IUADD	INTEGER	PLACES	REFS	16			
40	IUADDI	INTEGER	PLACES	REFS	16			
32	IUB	INTEGER	PLACES	REFS	16			
70	IUBAL	INTEGER	PLACES	REFS	16			
42	IUBALI	INTEGER	PLACES	REFS	16			
116	IUBR	INTEGER	PLACES	REFS	16			
52	IUBT	INTEGER	PLACES	REFS	16			
16	IUCD	INTEGER	PLACES	REFS	16			
72	IUDESF	INTEGER	PLACES	REFS	16			
44	IUDESI	INTEGER	PLACES	REFS	16			
54	IUDESN	INTEGER	PLACES	REFS	16			
34	IUDESO	INTEGER	PLACES	REFS	16			
20	IUDLT	INTEGER	PLAYFF	REFS	36			
2	IUDLTI	INTEGER	PLAYFF	REFS	36			
76	IUDUM1	INTEGER	PLAYFF	REFS	36			
100	IUDUM2	INTEGER	PLAYFF	REFS	36			
102	IUDUM3	INTEGER	PLAYFF	REFS	36			
4	IUGO1	INTEGER	PLAYFF	REFS	36			
5	IUGO2	INTEGER	PLAYFF	REFS	36			
6	IUGO3	INTEGER	PLAYFF	REFS	36			
7	IUGO4	INTEGER	PLAYFF	REFS	36			
140	IUINCK	INTEGER	PLAYFF	REFS	36			
136	IUINCM	INTEGER	PLAYFF	REFS	36			
0	IUIN1	INTEGER	PLAYFF	REFS	36			
1	IUIN2	INTEGER	PLAYFF	REFS	36			
30	IUKS	INTEGER	PLAYFF	REFS	36			
104	IUL	INTEGER	PLAYFF	REFS	36			
114	IULR	INTEGER	PLAYFF	REFS	36			
56	IUMD	INTEGER	PLAYFF	REFS	36			
64	IUMEMO	INTEGER	PLAYFF	REFS	36			
36	IUMDBI	INTEGER	PLAYFF	REFS	36			
0	IUMOFF	INTEGER	PLAYFF	REFS	36			
60	IUMEMF	INTEGER	PLAYFF	REFS	36			
24	IUMEMN	INTEGER	PLAYFF	REFS	36			
50	IUMEMO	INTEGER	PLAYFF	REFS	36			
124	IUMODK	INTEGER	PLAYFF	REFS	36			
122	IUMODM	INTEGER	PLAYFF	REFS	36			
14	IUMPL	INTEGER	PLAYFF	REFS	36			
6	IUMPLI	INTEGER	PLAYFF	REFS	36			
2	IUOUT1	INTEGER	PLAYFF	REFS	36			
3	IUOUT2	INTEGER	PLAYFF	REFS	36			
12	IUPATF	INTEGER	PLAYFF	REFS	36			
134	IIPH	TNTFGFR	PLAYFF	REFS	36			



SUBROUTINE FFMASS		74/74	OPT=1	RELOCATION		FTN 4 8+577	85/01/23 . 08 . 10 . 44	PAGE 9
VARIABLES	SN	TYPE						
1162 MROW	5	INTEGER						
1240 NAM	5	INTEGER						
1203 NAME		ARRAY	KLUES	REFS	55	57	222	
1255 NAME2		INTEGER	ARRAY	REFS	33	214	DEFINED	47
1242 NAMFFM		INTEGER	ARRAY	REFS	13	55	109	187
13 NBAR		INTEGER	ARRAY	REFS	12	102	DEFINED	48
1202 NBYTE		INTEGER	ARRAY	REFS	14	222	DEFINED	47
1221 NC		INTEGER	ARRAY	REFS	13	104	109	111
1177 NCARD		INTEGER	ARRAY	REFS	33	168	DEFINED	164
1167 NCOL		INTEGER	ARRAY	REFS	12	172	DEFINED	170
20 NCYC		INTEGER	KLUES	REFS	170	102	104	118
4 NDESNO		INTEGER	SIZES	REFS	33	169	DEFINED	170
5 NDESYS		INTEGER	SIZES	REFS	12	168	DEFINED	111
2 NDYDOF		INTEGER	SIZES	REFS	70	104		
14 NFIX		INTEGER	KLUES	REFS	33	188		
21 NNN		INTEGER	KLUES	REFS	33			
3 NNOPNT		INTEGER	SIZES	REFS	33			
6 NPAGE		INTEGER	CLIST	REFS	44			
6 NPASS		INTEGER	KLUES	REFS	42			
1166 NPGDOF		INTEGER	KLUES	REFS	33			
1216 NR		INTEGER	ARRAY	REFS	68			
1170 NROW		INTEGER	ARRAY	REFS	97	2*159	160	96
1 NSTDOF		INTEGER	SIZES	REFS	12	79	161	84
0 NSTMEM		INTEGER	SIZES	REFS	12	167	169	84
11 PHP		REAL	PLUG	REFS	12	168	169	164
0 TPLUG		REAL	F.P.	REFS	69	103	109	119
10 VDES		REAL	KLUES	REFS	68			
1224 WW		REAL	ARRAY	REFS	11			
1205 XM		REAL	ARRAY	REFS	11			
1227 XMI		REAL	ARRAY	REFS	12			
FILE NAMES	MODE							
	TAPE6	FMT						
VARIABLES USED AS FILE NAMES,			WRITES		96	98		
SEE ABOVE								
EXTERNALS	TYPE	ARGS	REFERENCES					
DCLOSE		1	61	106	113	190	218	234
DREAD		3	189					
GEDLAB		6	55	109	111	187		
GETROW		4	58					
IV33		2	200					
MESSAGE		3	51					
NASTRD		8	77	79	82	84	159	161
PROGNA		2	50					
PUDLAB		6	102	214	216	222		
PUTROW		4	104					
TITLES		1	176					
STATEMENT LABELS	DEF LINE	REFERENCES						
0 50	60	57						
0 55	72	55						
0 60	73	60						
0 65	73	65						

## STATEMENT LABELS

DEF LINE

REFERENCES

0	61	83	81
116	62	87	76
147	65	94	88
152	66	96	90
167	67	99	86
0	68	105	103
210	69	108	65
0	70	112	110
223	72	114	107
0	75	127	123
0	80	129	120
0	82	135	133
0	85	142	140
0	90	144	137
0	100	154	150
0	102	162	160
372	105	164	158
424	110	171	166
427	112	173	163
0	115	182	179
460	120	186	156
467	130	192	145
0	140	198	196
0	145	210	208
0	150	212	205
0	160	217	215
0	170	229	227
0	180	231	224
0	190	233	223
0	666	98	97
1111	9000	237	164
1114	9001	238	177
1124	9002	240	180
1130	9003	241	87
1133	9004	242	66
1135	9005	243	96
1147	9006	245	98
16	50	1	57
36	60	1	69
43	55	J	70
77	61	I	81
121		K	87
135	65	K	88
155	666	J	97
176	68	I	103
213	70	I	110
227	80	I	120
230	80	K	121
241	75	J	123
267	82	I	133
274	82	J	134
303	90	I	137
304	90	K	138
315	85	J	140

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
16	50	I	57	60	7B
36	60	I	69	73	12B
43	55	J	70	72	2B
77	61	I	81	83	10B
121		K	87	87	12B
135	65	K	88	94	15B
155	666	J	97	98	12B
176	68	I	103	105	10B
213	70	I	110	112	7B
227	80	I	120	129	37B
230	80	K	121	129	33B
241	75	J	123	127	14B
267	82	I	133	135	13B
274	82	J	134	135	2B
303	90	I	137	144	27B
304	90	K	138	144	23B
315	85	J	140	142	4B

INSTACK

EXT REFS

NOT INNER

OPT

EXT REFS

EXT REFS

EXT REFS

NOT INNER

OPT

NOT INNER

INSTACK

NOT INNER

NOT INNER

INSTACK

SUBROUTINE FFMASS		74/74		OPT = 1		FTN 4.8+577		85/01/23. 08.10.44	
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES				PAGE
					INSTACK	EXT REFS			11
341	100	J	151	154	5B				
361	102	I	160	162	11B				
375		K	164	164	12B				
415	110	K	166	171	10B	OPT	EXT REFS	NOT INNER	
437	115	I	179	182	20B				
442		J	180	180	10B				
470	140	I	196	198	14B				
475	140	J	197	198	3B	INSTACK	NOT INNER	NOT INNER	
506	150	I	205	212	27B				
507	150	K	206	212	23B				
520	145	J	208	210	4B	INSTACK	EXT REFS	NOT INNER	
537	160	K	215	217	7B				
552	190	I	223	233	34B				
553	180	K	224	231	26B				
567	170	J	227	229	4B	INSTACK	EXT REFS	NOT INNER	
COMMON BLOCKS		PLACES	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
			9B	O IUIINI (1)	1 IUIIN2 (1)	2 IUDUT1 (1)			
				3 IUDUT2 (1)	4 IUGO1 (1)	5 IUGO2 (1)			
				6 IUGO3 (1)	7 IUGO4 (1)	8 IUSCR (1)			
				9 IFSCR (1)	10 IFS1 (1)	11 IFS2 (1)			
				12 IFS3 (1)	13 IFS4 (1)	14 IUCD (1)			
				15 IUPR (1)	16 IUA (1)	17 IFA (1)			
				18 IUY (1)	19 IFY (1)	20 IUMEMN (1)			
				21 IFMEMN (1)	22 IUSTFN (1)	23 IFSTFN (1)			
				24 IUKS (1)	25 IFKS (1)	26 IUB (1)			
				27 IFB (1)	28 IUDESQ (1)	29 IFDESD (1)			
				30 IUMDBI (1)	31 IFMDBI (1)	32 IUADDI (1)			
				33 IFADDI (1)	34 IUBALI (1)	35 IFBALI (1)			
				36 IUDESI (1)	37 IFDESI (1)	38 IUWTI (1)			
				39 IFWTI (1)	40 IUMEMO (1)	41 IFMEMO (1)			
				42 IUBT (1)	43 IFBT (1)	44 IUDESN (1)			
				45 IFDESN (1)	46 IUMD (1)	47 IFMD (1)			
				48 IUMEMF (1)	49 IFMEMF (1)	50 IUSTFO (1)			
				51 IFSTFO (1)	52 IUMDB (1)	53 IFMDB (1)			
				54 IUADD (1)	55 IFADD (1)	56 IUBAL (1)			
				57 IFBAL (1)	58 IUDESF (1)	59 IFDESF (1)			
				60 IUWT (1)	61 IFWT (1)	62 IUDUM1 (1)			
				63 IFDUM1 (1)	64 IUDUM2 (1)	65 IFDUM2 (1)			
				66 IUDUM3 (1)	67 IFDUM3 (1)	68 IUL (1)			
				69 IFL (1)	70 IUYT (1)	71 IFYT (1)			
				72 Iuz (1)	73 IFZ (1)	74 Iuzr (1)			
				75 IFZR (1)	76 IULR (1)	77 IFLR (1)			
				78 IUBR (1)	79 IFBR (1)	80 IUPHTF (1)			
				81 IFPHTF (1)	82 IUMODM (1)	83 IFMODM (1)			
				84 IUMODK (1)	85 IFMODK (1)	86 IUPHT (1)			
				87 IFPHT (1)	88 IUQT (1)	89 IFQT (1)			
				90 IUQ (1)	91 IFQ (1)	92 IUPH (1)			
				93 IFPH (1)	94 IUIINC (1)	95 IFINCM (1)			
				96 IUIINCK (1)	97 IFINCK (1)	98 IREDS (1)			
				99 KLUSE (1)	100 KLUNAL (1)	101 KLUBAL (1)	2 IRDS (1)		
				101 KLUMLD (1)	102 IDNUP (1)	103 IDNUP-T (1)	5 WSADD (1)		
				104 NPASS (1)	105 IDWMAX (1)	106 IDWMAX (1)	8 VDES (1)		
				107 EPS1 (1)	108 IDNBAR (1)	109 IDNBAR (1)	11 NBAR (1)		
				110 NFIX (1)	111 IDD (1)	112 IDD (1)	14 DEL (1)		
				113 EPS2 (1)	114 IDNCV (1)	115 IDNCV (1)	17 NCVC (1)		
				116 TBAND (1)	117 IDFIN (1)	118 IDFIN (1)	20 KLLUR (1)		
				119 IDFINC (1)	120 IDFINC (1)	121 IDFINC (1)	24 KLUSES (1)		

PLAYFF	26	MEMBERS - BIAS NAME(LENGTH)	21 KLUQ (1) O IUMOFF (1) 3 IFDLT1 (1) 6 IUMPLI (1) 9 IFTPCT (1) 12 IUMPL (1) 15 IFSLT (1) 18 IUQA (1) 21 IFQAT (1) 24 IUPHAT (1) O KFREE (1) O EMP (9)	22 MORBAL (1) 1 IFMDFF (1) 4 IUSLT1 (1) 7 IFMPL1 (1) 10 IUPATF (1) 13 IFMPL (1) 16 IUDLT (1) 19 IFQA (1) 22 IUPHA (1) 25 IFPHAT (1)	23 DBAL (1) 2 IUDLT1 (1) 5 IFSLT1 (1) 8 IUTPGT (1) 11 IFPATF (1) 14 IUSLT (1) 17 IFDLT (1) 20 IUGAT (1) 23 IFPPHA (1)
KLUFF	1			9 PHP (120)	
PLUG	129				2 LINES (1)
CLIST	11	O KOUNT (1) 3 LINEST (1) 6 NPAGE (1) 9 KOUNTH (1) O NSTMEM (1) 3 NNOPT (1) O LKLUEV (1)	1 KPAGE (1) 4 KLABEL (1) 7 KBPAGE (1) 10 KOUNTI (1) 1 NSTDOF (1) 4 NDESNO (1) 1 KLUEV (20)	5 KTPAGE (1) 8 LINESG (1) 2 NDYDOF (1) 5 NDESYS (1)	
SIZES	6				
CLUEV	21				

STATISTICS  
 PROGRAM LENGTH 1332B 730  
 CM LABELED COMMON LENGTH 474B 316  
 52000B CM USED

SUBROUTINE IV33    74/74    OPT=1

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```

1       C   SUBROUTINE IV33(A,B)
2
3       C   DIMENSION A(3,3),B(3,3)
4
5       C   A11=A(1,1)
6         A21=A(2,1)
7         A22=A(2,2)
8         A31=A(3,1)
9         A32=A(3,2)
10        A33=A(3,3)
11
12        C   D=A11*(A22*A33-A32*A32)
13          -A21*(A21*A33-A32*A31)
14          +A31*(A21*A32-A22*A31)
15
16        C   B(1,1)= (A22*A33-A32*A32)/D
17         B(2,1)=-(A21*A33-A32*A31)/D
18         B(2,2)=(A11*A33-A31*A31)/D
19         B(3,1)=(A21*A32-A22*A31)/D
20         B(3,2)=-(A11*A32-A21*A31)/D
21         B(3,3)=(A11*A22-A21*A21)/D
22         B(1,2)=B(2,1)
23         B(1,3)=B(3,1)
24         B(2,3)=B(3,2)
25
26        C   RETURN
27
28        END

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS    DEF LINE    REFERENCES

3    1    26

VARIABLES	SN	TYPE	RELOCATION						
O    A		REAL	ARRAY F.P.	REFS	DEFIN	REFS	DEFIN	REFS	DEFIN
56    A11	1	REAL		3	1	12	18	20	21
57    A21		REAL				3*12	17	19	20
60    A22	6	REAL		6	6	2*12	16	19	21
61    A31		REAL				3*12	17	2*18	19
62    A32	8	REAL		8	8	4*12	2*16	17	19
63    A33	9	REAL		9	9	2*12	16	17	18
O    B		REAL	ARRAY F.P.			REFS	22	23	24
64    D	17	REAL				REFS	18	19	21
						REFS	16	17	19
						DEFINED	21	22	23
						DEFINED	1	2	24
						DEFINED	12	13	21

STATISTICS  
PROGRAM LENGTH    658

53

SUBROUTINE BSOLVE      74 / 74      OPT = 1

FTN 4 . 8 + 577

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PAGE 1

SUBROUTINE BSOLVE(KOBE, WORK)

```

1      C SUBROUTINE BSOLVE(KORE, WORK)
2
3      C
4      C DIMENSION KLUEV(20)
5      C DIMENSION NAMEYT(2)
6      1     'NAMEB(2)          ,NAMEZR(2)          ,NAMEBT(2)
7      C DIMENSION POS(20)
8      C DIMENSION WORK(1),NAME(2)
9
10     C
11     C GIVEN MATRICES A AND Y, THIS SUBROUTINE SOLVES THE MATRIX EQUATION
12     C AB=Y(TRAN) FOR B, AND THEN OBTAINS B(TRAN).
13
14     COMMON/PLACES/ IUN1,IUN2,IUOUT1,IUOUT2,IUGG01,IUGG02,IUGG03,IUGG04,
15           1   IUSCR,IFSC1,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR,
16           2   IUA,IFA,IUY,IFY,IUMEMN,IFMENN,IUSTFN,IFSTFN,
17           3   IUKS,IFKS,IUB,IFB,IUDESO,IFDESO,
18           4   IUMDBI,IFMDBI,IUADDI,IFADDI,IUFBALI,
19           5   IUDESI,IFDES1,IUWT1,IFWT1,
20           6   IUMEMO,IFMEMO,IUWT,IFBT,
21   IUDENSN,IFDESN,IUMD,IFMD,
22   IUMEMF,IFMEMF,
23   IUSTFO,IFSTFO,IUMDB,IFMDB,IUADD,IFADD,IFBAL,
24   A   IUDSF,IFDESF,IUWT,IFWT,
25   B   IUDUM1,IFDUM1,IUDUM2,IFDUM2,IUDUM3,IFDUM3,
26   C   IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IFZR,IULR,IFLR,
27   D   IUBR,IFBR,
28   E   IUPHFF,IFPHFF,IUMODM,IFMODM,
29   F   IUMODK,IFMODK,IUPHT,IFPHT,IUQT,IUQ,IFQ,
30   G   IUPH,IFPH,IUINCM,IFINCM,IUINCK,IFINCK,
31   COMMON /FILE / IPO5
32   COMMON /CLUEV / LKLUEV,KLUEV
33   COMMON /CLIST / KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE
34   1   ,KBPAGE,LINEG,KOUNT,KOUNT1
35   COMMON /KLUFF / KFREE
36
37   C DATA NAMEYT /4HYTRA, 4HNNSPO/
38   DATA NAMEZR /4HZREV, 4HERSE/
39   DATA NAMELR /4HLREV, 4HERSE/
40   DATA NAMEBR /4HBREV, 4HERSE/
41   DATA NAMEBT /4HBTRA, 4HNNSPO/
42   DATA NAMEM /4HBMAT, 4HRIX /
43   IOB=KLUEV(6)
44   KLSTM=1
45   KTYPE = 2
46   KOUNT=LINES
47   IPOS(IUA)=IFSA
48   IPOS(IUL)=IFL
49   IPOS(IUGG04)=IFS4
50
51   C STEP1. SPLIT A. A=L*L(TRAN). OBTAIN LOWER TRIANGLE L.
52   C
53   CALL PROGNA (4H(BSO. 4HLVE))
54   CALL MSG02 (1)
55   IPOS(IUA)=IFA
56   IPOS(IUL)=IFL
57   C
58
```

```

C
C STEP2. TRANSPOSE Y TO OBTAIN YT.
C
60      C JUNITF = IUY + 1
          CALL PROGNA (4H(BSO, 4HLVE))
          CALL MSGO2 (2)
          IPOS(IUY)=IFYT
          IPOS(IUYT)=IFYT
          CALL TRAN (KORE, WORK, WORK, IUY, IUYT, IUGO3, IUGO4, JUNITF, NAMEYT)

C
C STEP3. SOLVE LZ=YT FOR Z.
C
70      C CALL PROGNA (4H(BSO, 4HLVE))
          CALL MSGO2 (3)
          IPOS(IUL)=IFL
          IPOS(IUYT)=IFYT
          IPOS(IUZ)=IFZ
          CALL QFSOL(KORE, WORK, IUL, IUYT, IUZ, IUGO3, IUGO4)

C
C STEP4. REVERSE Z TO OBTAIN ZR.
C
80      C CALL PROGNA (4H(BSO, 4HLVE))
          CALL MSGO2 (4)

C
C IPOS(IUZ)=IFZ
IPOS(IUZR)=IFZR
CALL REVERS (KORE, WORK, WORK, IUZ, IUZR, NAMEZR)

C
C STEP5. REVERSE L TO OBTAIN LR.
C
90      C CALL PROGNA (4H(BSO, 4HLVE))
          CALL MSGO2 (5)

C
C IPOS(IUL)=IFL
IPOS(IUZR)=IFLR
CALL REVERS (KORE, WORK, WORK, IUL, IUZR, NAMELR)

C
C STEP6. SOLVE LR(TRAN)*BR=ZR FOR BR.
C
95      C CALL PROGNA (4H(BSO, 4HLVE))
          CALL MSGO2 (6)
          IPOS(IULR)=IFLR
          IPOS(IUZR)=IFZR
          IPOS(IUBR)=IFBR
          CALL QFSOL (KORE, WORK, NAMEBR, IULR, IUZR, IUGO3, IUGO4)

C
C STEP7. REVERSE BR TO OBTAIN B.
C
100     C CALL PROGNA (4H(BSO, 4HLVE))
          CALL MSGO2 (7)
          IPOS(IUBR)=IFBR
          IPOS(IUB)=IFB
          CALL REVERS (KORE, WORK, WORK, IUBR, IUB, NAMEB)
    
```

```

115      C
      C STEP8. TRANSPOSE B TO OBTAIN BT.
      C JUNITF=IUB+1
      CALL PROGNA (4H(BSO, 4H(LVE))
      CALL MSG02 (8)
      IPOS(IUB)=IFB
      IPOS(IUBT)=IFBT
      CALL TRN (KORE, WORK, WORK, IUB, IUBT, IUG03, IUG04, JUNITF, NAMEBT)

120      C
      CALL PROGNA (4H(BSO, 4H(LVE))

      C
      IF (IOB .NE. 2) GO TO 100
      IF (KFREE .EQ. 1) CALL PRMAT1(IUB, IFB, WORK, O, IUPR, 7, 8B,
      1 88H (TRANSPOSE OF BMATRIX TRANSFORMS DISPLACEMENTS FROM DYNAMICS
      2 MODEL TO STRUCTURES MODEL))

130      C
      IF (KFREE .EQ. 2) CALL PRMAT1(IUB, IFB, WORK, O, IUPR, 7, 97,
      1 97H (TRANSPOSE OF BMATRIX TRANSFORMS RELATIVE DISPLACEMENTS FROM
      2 DYNAMICS MODEL TO STRUCTURES MODEL))

135      100 CONTINUE
      C
      C RETURN
      C
      END

140

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES		
3 BSOLVE	1	139		
VARIABLES	SN	TYPE	RELOCATION	REFERENCES
21 IF A		INTEGER	PLACES	REFS 14 55
67 IF ADD		INTEGER	PLACES	REFS 14
41 IF ADDI		INTEGER	PLACES	REFS 14
33 IF B		INTEGER	PLACES	REFS 14
71 IF BAL		INTEGER	PLACES	REFS 14
43 IF BALI		INTEGER	PLACES	REFS 14
117 IF BR		INTEGER	PLACES	REFS 14
53 IF BT		INTEGER	PLACES	REFS 14
73 IF DESF		INTEGER	PLACES	REFS 14
45 IF DESI		INTEGER	PLACES	REFS 14
55 IF DESN		INTEGER	PLACES	REFS 14
35 IF DESO		INTEGER	PLACES	REFS 14
77 IF DUM1		INTEGER	PLACES	REFS 14
101 IF DUM2		INTEGER	PLACES	REFS 14
103 IF DUM3		INTEGER	PLACES	REFS 14
141 IF INCK		INTEGER	PLACES	REFS 14
137 IF INCM		INTEGER	PLACES	REFS 14
31 IF KS		INTEGER	PLACES	REFS 14
105 IF L		INTEGER	PLACES	REFS 14
115 IF LR		INTEGER	PLACES	REFS 14 93

SUBROUTINE	BSOLVE	74//74	OPT=1
VARIABLES	SN	TYPE	RELOCATION
57	IFMD	INTEGER	PLACES
65	IFMDB	INTEGER	PLACES
37	IFM5B1	INTEGER	PLACES
61	IFMEMF	INTEGER	PLACES
25	IFMEMN	INTEGER	PLACES
51	IFMEMO	INTEGER	PLACES
125	IFMODK	INTEGER	PLACES
123	IFMODM	INTEGER	PLACES
135	IFPH	INTEGER	PLACES
27	IFSTFN	INTEGER	PLACES
63	IFS1FO	INTEGER	PLACES
121	IFPHTF	INTEGER	PLACES
133	IFQ	INTEGER	PLACES
131	IFQT	INTEGER	PLACES
11	IFSCR	INTEGER	PLACES
14	IFS3	INTEGER	PLACES
15	IFS4	INTEGER	PLACES
75	IFWI	INTEGER	PLACES
47	IFWT1	INTEGER	PLACES
23	IFY	INTEGER	PLACES
107	IFYT	INTEGER	PLACES
111	IFZ	INTEGER	PLACES
113	IFZR	INTEGER	PLACES
417	IOB	INTEGER	PLACES
0	IPOS	INTEGER	ARRAY
20	IUA	INTEGER	FILE
66	IUADD	INTEGER	FILE
40	IUADDI	INTEGER	FILE
32	IUB	INTEGER	FILE
70	IUBAL	INTEGER	PLACES
42	IUBAL1	INTEGER	PLACES
116	IUBR	INTEGER	PLACES
52	IUBT	INTEGER	PLACES
16	IUCD	INTEGER	PLACES
72	IUDESF	INTEGER	PLACES
44	IUDESI	INTEGER	PLACES
54	IUDESN	INTEGER	PLACES
34	IUDESO	INTEGER	PLACES
76	IUDUM1	INTEGER	PLACES
100	IUDUM2	INTEGER	PLACES
102	IUDUM3	INTEGER	PLACES
4	IUGO1	INTEGER	PLACES
5	IUGO2	INTEGER	PLACES
6	IUGO3	INTEGER	PLACES
7	IUGO4	INTEGER	PLACES
140	IUINCK	INTEGER	PLACES
136	IUINCM	INTEGER	PLACES
0	IUIN1	INTEGER	PLACES
1	IUIN2	INTEGER	PLACES
30	IUKS	INTEGER	PLACES



5

PAGE

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FTN 4 . 8+577

OPT = 1

SUBROUTINE QFACT

74/74

COMMON BLOCKS

COMRWP

LENGTH

CIDIV

3

CONSIS

1

CLIST

2

FILE

11

20

MEMBERS - BIAS NAME(LENGTH)

O ITAPER (1)

O IDIV (1)

O NO (1)

O KOUNT (1)

3 LINES (1)

6 NPAGE (1)

9 KOUNTH (1)

O IPPOS (20)

1 ITAPEW (1)

2 ITAPEP (1)

1 YES (1)

1 KPAGE (1)

4 KLABEL (1)

7 KBPAGE (1)

10 KOUNTI (1)

## STATISTICS

PROGRAM LENGTH

435B

285

CM LABELED COMMON LENGTH

45B

37

52000B CM USED



SUBROUTINE QFACT		74/74 OPT=1	
115		WRITE(1TAPEW, 20) KOUNT=KOUNT+2	
	C	950 CONTINUE CALL DCLOSE (MA) CALL DCLOSE (ML) CALL DCLOSE (M1) CALL DCLOSE (M2) CALL TIMEB (10, 10HFF) CALL MESSAGE (2, 5, :)	
120		C FORMAT STATEMENTS	
125	C	4 FORMAT(/, 10X, 10(1H* 5 FORMAT(/, 10X, 20 FORMAT(/, 10X, 1 46H 22H	
130	C	RETURN END	
SYMBOLIC REFERENCE MAP (R=3)			
ENTRY POINTS	DEF LINE	REFERENCES	
3 QFACT	36	132	
TABLES	SN	TYPE	RELOCATION
O A	REAL	ARRAY	F.P.
O IDIV	INTEGER	ARRAY	CIDIV
IND	INTEGER		
I0	INTEGER		
O IP0S	INTEGER	ARRAY	FILE
O ITAPEP	INTEGER	COMRW	COMRW
O ITAPER	INTEGER	COMRW	COMRW
I ITAPEW	INTEGER		
K *	INTEGER		
KBPAGE	INTEGER		
KEE	INTEGER		
KEY	INTEGER		
KLABEL	INTEGER		
KLISTM	INTEGER		
KORE	INTEGER		
O KOUNT	INTEGER		
SYMBOLIC REFERENCE MAP (R=3)			
ENTRY POINTS	DEF LINE	REFERENCES	
3 QFACT	36	132	
TABLES	SN	TYPE	RELOCATION
O A	REAL	ARRAY	F.P.
O IDIV	INTEGER	ARRAY	CIDIV
IND	INTEGER		
I0	INTEGER		
O IP0S	INTEGER	ARRAY	FILE
O ITAPEP	INTEGER	COMRW	COMRW
O ITAPER	INTEGER	COMRW	COMRW
I ITAPEW	INTEGER		
K *	INTEGER		
KBPAGE	INTEGER		
KEE	INTEGER		
KEY	INTEGER		
KLABEL	INTEGER		
KLISTM	INTEGER		
KORE	INTEGER		
O KOUNT	INTEGER		
SYMBOLIC REFERENCE MAP (R=3)			
ENTRY POINTS	DEF LINE	REFERENCES	
3 QFACT	36	132	
TABLES	SN	TYPE	RELOCATION
O A	REAL	ARRAY	F.P.
O IDIV	INTEGER	ARRAY	CIDIV
IND	INTEGER		
I0	INTEGER		
O IP0S	INTEGER	ARRAY	FILE
O ITAPEP	INTEGER	COMRW	COMRW
O ITAPER	INTEGER	COMRW	COMRW
I ITAPEW	INTEGER		
K *	INTEGER		
KBPAGE	INTEGER		
KEE	INTEGER		
KEY	INTEGER		
KLABEL	INTEGER		
KLISTM	INTEGER		
KORE	INTEGER		
O KOUNT	INTEGER		
SYMBOLIC REFERENCE MAP (R=3)			
ENTRY POINTS	DEF LINE	REFERENCES	
3 QFACT	36	132	
TABLES	SN	TYPE	RELOCATION
O A	REAL	ARRAY	F.P.
O IDIV	INTEGER	ARRAY	CIDIV
IND	INTEGER		
I0	INTEGER		
O IP0S	INTEGER	ARRAY	FILE
O ITAPEP	INTEGER	COMRW	COMRW
O ITAPER	INTEGER	COMRW	COMRW
I ITAPEW	INTEGER		
K *	INTEGER		
KBPAGE	INTEGER		
KEE	INTEGER		
KEY	INTEGER		
KLABEL	INTEGER		
KLISTM	INTEGER		
KORE	INTEGER		
O KOUNT	INTEGER		
SYMBOLIC REFERENCE MAP (R=3)			
ENTRY POINTS	DEF LINE	REFERENCES	
3 QFACT	36	132	
TABLES	SN	TYPE	RELOCATION
O A	REAL	ARRAY	F.P.
O IDIV	INTEGER	ARRAY	CIDIV
IND	INTEGER		
I0	INTEGER		
O IP0S	INTEGER	ARRAY	FILE
O ITAPEP	INTEGER	COMRW	COMRW
O ITAPER	INTEGER	COMRW	COMRW
I ITAPEW	INTEGER		
K *	INTEGER		
KBPAGE	INTEGER		
KEE	INTEGER		
KEY	INTEGER		
KLABEL	INTEGER		
KLISTM	INTEGER		
KORE	INTEGER		
O KOUNT	INTEGER		

SUBROUTINE QFACT

74/74

OPT=1

FTN 4 8+577

PAGE 2

DATA MATNAM/4HLOTR,4HISTF/  
DATA MATNAN/4HSCKA,4HTCH2/

C

60 NIX = 0

KEE = 0

W = 2

NFLIMA = IPOS(MA)

CALL GEDLAB (BHQFACT O1,MA,NAME ,NFLIMA,M,IO)

70 IF (M-IO) 930,80,930

80 LARGE = M + 2

LEAVE = KORE - M / IDIV

LEFT = LEAVE - LARGE

IF (LEFT - M) 920,100,100

100 IO = M1 + M2

M1 = MA

MO = M1

NU = 1

NFLIML = IPOS(ML)

CALL PUDLAB (BHQFACT O1,ML,MATNAM,NFILML,M,MM )

110 CONTINUE

NFLIMO = IPOS(MO)

CALL PUDLAB (BHQFACT O2,MO,MATNAN,NFILMO,M,MM )

CALL QCHOL (A(LARGE),A(A(LEAVE),M,NU,LEFT,ML,MI,MO,KEY,KEE,NIX,W,

1 NAME,KLISTM,KTYPE)

1 IF (NIX) 950,120,160

120 IF (KEY) 130,150,130

130 LAFT=LINE\$-KOUNT

IF (LAFT.LT.2) KOUNT=LINE\$

CALL TITLES(2)

WRITE(ITAPEW,5)

KOUNT=KOUNT+2

KEE = 1

M1 = MO

MO = IO - MI

NFLIMI = IPOS(MI)

CALL GEDLAB (BHQFACT O2,MI,NAME ,NFLIMI,N,K )

90 GO TO 110

150 CONTINUE

GO TO 950

160 INDNIX

LAFT=LINE\$-KOUNT

IF (LAFT.LT.2) KOUNT=LINE\$

CALL TITLES(2)

WRITE(ITAPEW,4) IND

KOUNT=KOUNT+2

GO TO 950

920 IND=52

LAFT=LINE\$-KOUNT

IF (LAFT.LT.2) KOUNT=LINE\$

CALL TITLES(2)

WRITE(ITAPEW,4) IND

KOUNT=KOUNT+2

GO TO 950

100 IND=16

LAFT=LINE\$-KOUNT

IF (LAFT.LT.2) KOUNT=LINE\$

CALL TITLES(2)

QFACT

85 GO TO 110

95

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7A/7A OPT 1

ETN 4 8+57

85/01/23 08:10:44

PAGE 1

```

1      C45700. SUB. QFACT (REND STIFFNESS MATRIX - DECOMPOSE TO LOWER TRIANG.)
2      C***** QFACT(3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57)
3      C***** QFACT(45,46,47,48,49,50,51,52,53,54,55,56,57)
4      C***** QFACT(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57)
5      C*** SUBROUTINE QFACT (MA ,ML ,M1 ,M2) *****
6      C*** COMPUTER VERSION *****
7      C*** IBM ... AS IS.
8      C   CDC ... AS IS.
9      C*** OBJECTIVE *****
10     C   READS THE POSITIVE DEFINITE SYMMETRIC STIFFNESS MATRIX AND SETS
11     C   UP INDICES FOR THE SUBROUTINE QCHOL TO GET THE LOWER TRIANGLE
12     C   OF AN L X L TRANSPOSE DECOMPOSITION ONE ROW AT A TIME.
13     C*** INPUT/OUTPUT *****
14     C   THIS SUBROUTINE RECEIVES THE NAMES OF THE STIFFNESS AND LOWER
15     C   TRIANGULAR MATRICES AND USES THEM TOGETHER WITH THEIR SIZES TO
16     C   CONTROL QCHOL.
17     C*** SUMMARY OF SYMBOLS *****
18     C*** ERROR MESSAGES *****
19     C   *** ERROR --- ***
20     C   *** ERROR - DIMENSIONS READ FROM LABEL OF TOTAL STIFFNESS
21     C   MATRIX INDICATE THAT THE MATRIX IS NOT SQUARE ***
22     C*** SUBROUTINE QFACT (KORE,A,MA,ML,M1,M2,KLISTM,KTYPE)
23     C   INTEGER YES
24     C   DIMENSION A(1)
25     C   DIMENSION IP05(20)
26     C   DIMENSION MATNAM(2)
27     C   DIMENSION NAME(2)
28     C
29     C   COMMON /COMRWP/ ITAPER,ITAPEN,ITAPEP
30     C   COMMON /CIDIV/ IDIV
31     C   COMMON /CONSTS/ NO ,YES
32     C   COMMON /CLIST/ KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE
33     C   1 COMMON /FILE / IP05
34     C
35     C   DATA INITIALIZATION
36     C
37     C   CALL PROGNA (4H(QFA,4HCT ))
38     C   CALL MESSAGE (1,38,38
39     C   1 HFACT - MANAGES CHOLESKY FACTORIZATION)
40     C   CALL TIMEB (11,11HFROM QFACT )

```

SUBROUTINE MSG02      74/74      OPT=1      FTN 4.8+577      85/01/23. 08.10.44      PAGE 5  
COMMON BLOCKS LENGTH      MEMBERS - BIAS NAME(LENGTH)  
                                6 NPAGE (1)  
                                9 KOUNTH (1)      7 KBPAGE (1)  
                                10 KOUNTI (1)      8 LINESG (1)

STATISTICS  
PROGRAM LENGTH      361B      241  
CM LABELED COMMON LENGTH      16B      14  
52000B CM USED

SUBROUTINE MSGO2			74/74	OPT = 1		FTN 4.8+577	85/01/23.	08.10.44	PAGE	4
VARIABLES	SN	TYPE	RELOCATION							
			64	2*66	79	2*81	94	2*96	109	2*111
			124	2*126	DEFINED	20	23	34	36	49
			51	64	66	79	81	94	96	109
11	KOUNTH	INTEGER	CLIST	REFS	111	124	126	36	51	96
12	KOUNTI	INTEGER	CLIST	REFS	111	126	23	66	66	81
			64	7	7	20	23	34	36	49
			124	126	DEFINED	79	81	94	96	111
			93	108	123	19	33	48	63	78
1	KPAGE	INTEGER	CLIST	REFS	93	108	123			
0	KSTEP	INTEGER	F.P.	REFS	7	11	DEFINED	4		
5	KTPAGE	INTEGER	CLIST	REFS	7					
2	LINES	INTEGER	CLIST	REFS	7					
10	LINESG	INTEGER	CLIST	REFS	7					
3	LINEST	INTEGER	CLIST	REFS	7					
357	LSKIPA	INTEGER	REFS	19	25	33	39	48	54	63
			69	78	84	93	99	108	114	123
			129	DEFINED	17	31	46	61	76	91
			106	121						
			REFS	19	21	33	37	48	52	63
			67	78	82	93	97	108	112	123
			127	DEFINED	18	32	47	62	77	92
360	LSKIPB	INTEGER	REFS	19	33	48	63	78	93	108
			107	122						
			REFS	19	10					
6	NPAGE	INTEGER	CLIST	REFS	7					
			VARIABLES USED AS FILE NAMES. SEE ABOVE							
EXTERNALS	TYPE	ARGS	REFERENCES							
PLB		3	21	25						
TITLES		1	84	97						
			22	35						
				50	55					
					65					
					80					
					95					
STATEMENT LABELS			DEF LINE	REFERENCES						
23	100		16	11						
	42	200	30	11						
	62	300	45	11						
	102	400	60	11						
	122	500	75	11						
	142	600	90	11						
	162	700	105	11						
	202	800	120	11						
	221	1000	131	26						
	264	1100	FMT	133	24					
	273	1200	FMT	135	38					
	302	1300	FMT	137	53					
	311	1400	FMT	139	68					
	320	1500	FMT	141	83					
	327	1600	FMT	143	98					
	336	1700	FMT	145	113					
	345	1800	FMT	147	128					
COMMON BLOCKS	LENGTH		MEMBERS - BIAS NAME(LENGTH)							
COMRWP	3		O ITAPER (1)							
CLIST	11		O COUNT (1)							
			2 ITAPEP (1)							
			2 LINES (1)							
			2 KPAGE (1)							
			2 VTPAGE (1)							

SUBROUTINE MSGO2

74/74

OPT = 1

FTN 4.8+577

PAGE 3

```

115      GO TO 1000
C
C
C STEP 8
C
120      800 CONTINUE
        LSKIPA = 0
        LSKIPB = 2
        KOUNTI = LSKIPB + LSKIPA + LTEXT
        KOUNT = KOUNT + KOUNTI
        CALL TITLES (2)
        IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
        CALL PLB (1,LSKIPB,ITAPEW)
        WRITE (ITAPEW,1B00)
        CALL PLB (1,LSKIPA,ITAPEW)
C
130      1000 CONTINUE
C
        1100 FORMAT (10X,20(1H*),2X,28HSTEP 1 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
        1200 FORMAT (10X,20(1H*),2X,28HSTEP 2 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
        1300 FORMAT (10X,20(1H*),2X,28HSTEP 3 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
        1400 FORMAT (10X,20(1H*),2X,28HSTEP 4 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
        1500 FORMAT (10X,20(1H*),2X,28HSTEP 5 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
        1600 FORMAT (10X,20(1H*),2X,28HSTEP 6 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
        1700 FORMAT (10X,20(1H*),2X,28HSTEP 7 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
        1800 FORMAT (10X,20(1H*),2X,28HSTEP 8 FROM PROGRAM BSOLVE ,2X,20(1H*)
        1,/)
C
150      RETURN
END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 MSGO2	4	150

VARIABLES	SN	TYPE	RELOCATION	REFS	6	25	37	39	52	54
2 ITAPEP		INTEGER	COMRWP	REFS	6				99	112
0 ITAPER		INTEGER	COMRWP	REFS	6	21				114
1 ITAPEW		INTEGER	COMRWP	REFS	67	82	97			83
					127	129	1/O REFS	38	53	68
					98	113	128			
7 KBPAGE		INTEGER	CLIST	REFS	7					
4 KLABEL		INTEGER	CLIST	REFS	7	20	2*23	34	2*36	49
0 KOUNT		INTEGER	CLIST	REFS						2*51

SUBROUTINE MSGO2

FTN 4.8+577

PAGE 2

85/01/23 08.10.44

```

C STEP 4
C
60   400 CONTINUE
      LSKIPA = 0
      LSKIPB = 2
      KOUNTI = LSKIPB + LSKIPA + LTEXT
      KOUNT = KOUNT + KOUNTI
      CALL TITLES (2)
      IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
      CALL PLB (1,LSKIPB,ITAPEW)
      WRITE (ITAPEW,1400)
      CALL PLB (1,LSKIPA,ITAPEW)
      GO TO 1000
C
C STEP 5
C
75   500 CONTINUE
      LSKIPA = 0
      LSKIPB = 2
      KOUNTI = LSKIPB + LSKIPA + LTEXT
      KOUNT = KOUNT + KOUNTI
      CALL TITLES (2)
      IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
      CALL PLB (1,LSKIPB,ITAPEW)
      WRITE (ITAPEW,1500)
      CALL PLB (1,LSKIPA,ITAPEW)
      GO TO 1000
C
C STEP 6
C
80   600 CONTINUE
      LSKIPA = 0
      LSKIPB = 2
      KOUNTI = LSKIPB + LSKIPA + LTEXT
      KOUNT = KOUNT + KOUNTI
      CALL TITLES (2)
      IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
      CALL PLB (1,LSKIPB,ITAPEW)
      WRITE (ITAPEW,1600)
      CALL PLB (1,LSKIPA,ITAPEW)
      GO TO 1000
C
C STEP 7
C
85   700 CONTINUE
      LSKIPA = 0
      LSKIPB = 2
      KOUNTI = LSKIPB + LSKIPA + LTEXT
      KOUNT = KOUNT + KOUNTI
      CALL TITLES (2)
      IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
      CALL PLB (1,LSKIPB,ITAPEW)
      WRITE (ITAPEW,1700)
      CALL PLB (1,LSKIPA,ITAPEW)

90
95
100
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110

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      MSGO2 59
      MSGO2 60
      MSGO2 61
      MSGO2 62
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      MSGO2 111
      MSGO2 112
      MSGO2 113
      MSGO2 114
      MSGO2 115

```

SUBROUTINE MSG02 74/74 OPT=1

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```
1      C
C45700. SUB. MSG02 (LIST MESSAGES - VERSION 02)
C
C      SUBROUTINE MSG02 (KSTEP)
C
C      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP
C      COMMON /CLIST/ KOUNT ,KPAGE ,LINES ,LINEST ,KLABEL ,KTPAGE ,NPAGE
C      1           ,KPAGE ,LINESG ,KOUNTH ,KOUNTI
C
C      LTEXT=2
C      GO TO (100, 200, 300, 400, 500, 600, 700, 800), KSTEP
C
C      C STEP 1
C
C      100 CONTINUE
C          LSKIPA = 0
C          LSKIPB=0
C          KOUNTI = LSKIPB + LSKIPA + LTEXT
C          KOUNT = KOUNT + KOUNTI
C          CALL PLB (1,LSKIPB,ITAPEW)
C          CALL TITLES (2)
C          IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
C          WRITE (ITAPEW,1100)
C          CALL PLB (1,LSKIPA,ITAPEW)
C          GO TO 1000
C
C      C STEP 2
C
C      200 CONTINUE
C          LSKIPA = 0
C          LSKIPB = 2
C          KOUNTI = LSKIPB + LSKIPA + LTEXT
C          KOUNT = KOUNT + KOUNTI
C          CALL TITLES (2)
C          IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
C          CALL PLB (1,LSKIPB,ITAPEW)
C          WRITE (ITAPEW,1200)
C          CALL PLB (1,LSKIPA,ITAPEW)
C          GO TO 1000
C
C      C STEP 3
C
C      300 CONTINUE
C          LSKIPA = 0
C          LSKIPB = 2
C          KOUNTI = LSKIPB + LSKIPA + LTEXT
C          KOUNT = KOUNT + KOUNTI
C          CALL TITLES (2)
C          IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + KOUNTI
C          CALL PLB (1,LSKIPB,ITAPEW)
C          WRITE (ITAPEW,1300)
C          CALL PLB (1,LSKIPA,ITAPEW)
C          GO TO 1000
C
C      450
C
C      500
C
C      550
```

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      MSG02   2
      MSG02   3
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      MSG02  54
      MSG02  55
      MSG02  56
      MSG02  57
```

SUBROUTINE BSOLVE      74/74      OPT=1  
STATISTICS  
PROGRAM LENGTH      532B      346  
CM LABELED COMMON LENGTH      227B      151  
52000B CM USED

FTN 4.8+577      85/01/23. 08.10.44      PAGE 7

SUBROUTINE BSOLVE		74/74 OPT+1		FTN 4.8+577		85/01/23. 08.10.44		PAGE 6	
EXTERNALS	TYPE	ARGS	REFERENCES						
MSG02		1	54	64	73	82	91	101	111 121
PRMAT <sup>1</sup>		8	129	133	72	81	90	100	110 120 126
PROGNA		2	53	63					
QBSOL		8	105						
QFACT		8	57						
QFSOL		7	77						
REVERS		6	86	95					
TRAN		9	67	124					
STATEMENT LABELS		DEF LINE	REFERENCES						
203	100	136	128						
COMMON BLOCKS	LENGTH	98	MEMBERS - BIAS NAME(LENGTH)						
PLACES			O IUIN1 (1)	1	IUIN2 (1)	2	IUOUT1 (1)		
			3 IUOUT2 (1)	4	IUGD1 (1)	5	IUGD2 (1)		
			6 IUGO3 (1)	7	IUGO4 (1)	8	IUSCR (1)		
			9 IFSCR (1)	10	IFS1 (1)	11	IFS2 (1)		
			12 IFS3 (1)	13	IFS4 (1)	14	IUCD (1)		
			15 IUPR (1)	16	IUA (1)	17	IFA (1)		
			18 IUY (1)	19	IFY (1)	20	IUMEMN (1)		
			21 IFMEMN (1)	22	IUSTFN (1)	23	IFSTFN (1)		
			24 IUKS (1)	25	IFKS (1)	26	IUB (1)		
			27 IFB (1)	28	IUDESO (1)	29	IFDESO (1)		
			30 IUMDB1 (1)	31	IFMDB1 (1)	32	IUADDI (1)		
			33 IFADDI (1)	34	IUBAL1 (1)	35	IFBALI (1)		
			36 IUDESI (1)	37	IFDESI (1)	38	IUWTI (1)		
			39 IFWTI (1)	40	IUMEMO (1)	41	IFMEMO (1)		
			42 IUBT (1)	43	IFBT (1)	44	IUDES (1)		
			45 IFDES (1)	46	IUMD (1)	47	IFMD (1)		
			48 IUMEMF (1)	49	IFMEMF (1)	50	IUSTFO (1)		
			51 IFSTFO (1)	52	IUMDB (1)	53	IFMDB (1)		
			54 IUADD (1)	55	IFADD (1)	56	IUBAL (1)		
			57 IFBAL (1)	58	IUDEF (1)	59	IFDEF (1)		
			60 IUWT (1)	61	IFWT (1)	62	IUDUM1 (1)		
			63 IFDUM1 (1)	64	IUDUM2 (1)	65	IUDUM2 (1)		
			66 IUDUM3 (1)	67	IFDUM3 (1)	68	IUL (1)		
			69 IFL (1)	70	IUYT (1)	71	IFYT (1)		
			72 IUZ (1)	73	IFZ (1)	74	IUZR (1)		
			75 IFZR (1)	76	IULR (1)	77	IFLR (1)		
			78 IUBR (1)	79	IFBR (1)	80	IUPHTF (1)		
			81 IFPHTF (1)	82	IUMODM (1)	83	IFMODM (1)		
			84 IUMODK (1)	85	IFMODK (1)	86	IUPHT (1)		
			87 IFPHT (1)	88	IUQT (1)	89	IFQT (1)		
			90 IUFQ (1)	91	IFQ (1)	92	IUPH (1)		
			93 IFPH (1)	94	IUINCM (1)	95	IFINCM (1)		
			96 IUNICK (1)	97	IFINCK (1)				
FILE	20	0 IPDS (20)							
CLUEV	21	0 LKUEV (1)	1	KLUEV (20)	2	LINES (1)			
CLIST	11	0 KOUNT (1)	1	KPAGE (1)	5	KTPAGE (1)			
		3 LINEST (1)	4	KLABEL (1)	8	LINESG (1)			
		6 NPAGE (1)	7	KBPAGE (1)					
		9 KOUNTH (1)	10	KOUNT1 (1)					
		0 KFREE (1)							



SUBROUTINE QCHOL      74/74      OPT = 1

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```
COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS ,NCOLST,KTABLE,NPAGEA  
1      COMMON /ITAPET/ITAPET  
COMMON /REPORT/ KREPOR  
C          SOLUTV,EONE, 'S' )
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SUBROUTINE QCHOL    74/74    OPT=1

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115      52 KOL = 0
      55 LOC = LOC + 1
          J = J + 1
          IF (J .GE. JCOLS) GO TO 60
          IF (X(LOC) = 0.0, 55, 60
60      KOL = KOL + 1
      LROW(KOL) = K
      LCOL(KOL) = J
      ROW(KOL) = X(LOC)
      IF (J .EQ. JCOLS) GO TO 65
      IF (KOL .LT. KOLUMN) GO TO 55
65      JCU = KOL
      CALL TITLES (2)
      IF (K .EQ. 1) KTABLE = 2
      IF (KTYPE .EQ. 1)
130      1CALL PTABLE (2,34,34
          2 HLOWER TRIANGLE OF STIFFNESS MATRIX)
          IF (KTYPE .EQ. 2)
135      1CALL PTABLE (2,36,36
          2 HLOWER TRIANGLE OF FLEXIBILITY MATRIX)
          IF (KOUNT .GT. KOUNTH) GO TO 70
          IF (KTYPE .EQ. 1) WRITE (ITAPEW,2001)
          IF (KTYPE .EQ. 2) WRITE (ITAPEW,2005)
          CALL PLB (1,1,ITAPEW)
          WRITE (ITAPEW,2002) ((HEAD(IH,JH),IH=1,5),JH=1,KOLUMN)
          KOUNT = KOUNT + 3
70      CONTINUE
          KOUNT = KOUNT + 1
          WRITE (ITAPEW,2003) (LROW(KOL), LCOL(KOL), ROW(KOL), KOL=1,JCU)
          IF (J .LT. JCOLS) GO TO 52
115      CONTINUE
C
C FORM CHOLESKY DECOMPOSITION OF STIFFNESS OR FLEXIBILITY MATRIX
C
150      91 IF (NU-1) 130,100,130
          100 IF (LD - K) 120,920,920
          120 L(K) = K - LD
          130 IF (KEY) 170,140,170
          140 LEST = LOST + L(K)
          IF (LEST - KORE) 160,160,150
          150 KEY = 1
          160 LAST = K - 1
          170 LOW = KP1 - L(K)
          LD = MAXOF(LOW,NU)
160      LD1 = LD - 1
          180 IF (LD - LAG) 190,230,200
          190 LATE = LAG
          LAG = LD + 1
          LDLD = -LDLD
          GO TO 210
200      LATE = LD
          LAG = LAG + 1
210      DO 220 I = LAG,LATE
220      LDLD = LDLD + L(I)
          LDLD = IABSF(LDLD)
230      II = LDLD

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116      QCHOL
117      QCHOL
118      QCHOL
119      QCHOL
120      QCHOL
121      QCHOL
122      QCHOL
123      QCHOL
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127      QCHOL
128      QCHOL
129      QCHOL
130      QCHOL
131      QCHOL
132      QCHOL
133      QCHOL
134      QCHOL
135      QCHOL
136      QCHOL
137      QCHOL
138      QCHOL
139      QCHOL
140      QCHOL
141      QCHOL
142      QCHOL
143      QCHOL
144      QCHOL
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146      QCHOL
147      QCHOL
148      QCHOL
149      QCHOL
150      QCHOL
151      QCHOL
152      QCHOL
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162      QCHOL
163      QCHOL
164      QCHOL
165      QCHOL
166      QCHOL
167      QCHOL
168      QCHOL
169      QCHOL
170      QCHOL
171      QCHOL
172      QCHOL

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LARK = LDLD - LD1          QCHOL 173
C   FORM THE INNER PRODUCT      QCHOL 174
CALL HOTDOT (LD1,1,X,A(LARK),S,LEAST,INC,1)    QCHOL 175
LAG = LD                      QCHOL 176
I = LD                      QCHOL 177
INC = L(I) - 1              QCHOL 178
240 S = -X(I)                QCHOL 179
LEAST = MAXOF(I-INC,LOW)     QCHOL 180
IF (I - LAST) 250,250,260   QCHOL 181
250 INC = L(I+1) - 1        QCHOL 182
CALL HOTDOT (LD1,1,X,A(LARK),S,LEAST,INC,3)    QCHOL 183
X(I) = -S/A(II)             QCHOL 184
I = I + 1                   QCHOL 185
II = II + L(I)              QCHOL 186
GO TO 240                   QCHOL 187
260 IF (KEY) 310,270,310      QCHOL 188
C   KEEP TRACK OF MOST SERIOUS CANCELLATION. QUIT IF IT GETS TOO BAD.
270 ORIG = ABSF(T)           QCHOL 189
KJ = LOST                   QCHOL 190
DO 280 J = LOW,K            QCHOL 191
KJ = KJ + 1                 QCHOL 192
QCHOL 193
280 A(KJ) = X(J)             QCHOL 194
CALL HOTDOT (LD1,1,X,A(LARK),S,LEAST,INC,3)    QCHOL 195
T = -S                      QCHOL 196
IF (T .LE. ORIG*.1.E-7) GO TO 930
IF (T / ORIG .GE. WORST) GO TO 290
WORST = T / ORIG            QCHOL 197
INDEX = K                   QCHOL 198
QCHOL 199
290 X(I) = SQRTF(T)         QCHOL 200
A(II) = X(I)                QCHOL 201
QCHOL 202
LOST = LAST                  QCHOL 203
DO 300 J = KP1,M             QCHOL 204
300 X(J) = 0.                  QCHOL 205
CALL PUTROW (ML,1,X,M)       QCHOL 206
GO TO 320                   QCHOL 207
310 CALL PUTROW (MO,1,X,K)   QCHOL 208
320 CONTINUE                  QCHOL 209
QCHOL 210
QCHOL 211
QCHOL 212
C   ERROR MESSAGES
C   NU = LAST + 1             QCHOL 213
GO TO 990                   QCHOL 214
920 NIX = 42                  QCHOL 215
LAFT=LINE$-KOUNT             QCHOL 216
IF (LAFT.LT.3) KOUNT=LINE$  QCHOL 217
CALL TITLES(2)               QCHOL 218
WRITE(ITAPEW,4) NIX          QCHOL 219
WRITE(ITAPEW,921) K           QCHOL 220
KOUNT=KOUNT+3                QCHOL 221
GO TO 980                   QCHOL 222
930 NIX = 43                  QCHOL 223
980 JND=K                     QCHOL 224
990 IF (WORST .GE. .001) GO TO 1000
I = -ALOGCF(WORST)           QCHOL 225
LAFT=LINE$-KOUNT             QCHOL 226
IF (LAFT.LT.2) KOUNT=LINE$  QCHOL 227
QCHOL 228
QCHOL 229

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SUBROUTINE	QCHOL	74/74	OPT=1	FTN 4.8+577	85/01/23	08.10.44	PAGE	6
VARIABLES	SN	TYPE	RELOCATION					
7 ITAPET		INTEGER	CTABLE	REFS	58	138	I/O REFS	137
1 ITAPEW		INTEGER	COMRWP	REFS	54	230	232	139
771 J		INTEGER		REFS	219	118	122	143
772 JCOLS		INTEGER		REFS	117	117	191	193
774 JCU		INTEGER		REFS	232	113	117	204
755 JH		INTEGER		REFS	118	124	144	232
1013 JND	*	INTEGER		REFS	143	143	DEFINED	114
763 K		INTEGER		REFS	85	139	126	116
			DEFINED	REFS	224	224	DEFINED	84
			REFS	101	105	114	128	139
			REFS	154	157	158	191	151
			REFS	2*232	2*232	100	199	2152
7 KBPAGE		INTEGER	CLIST	REFS	56	106	DEFINED	105
0 KEE		INTEGER	F.P.	REFS	89	187	DEFINED	92
0 KEY		INTEGER	F.P.	REFS	153	193	DEFINED	156
1010 KJ		INTEGER	CLIST	REFS	192	90	111	192
4 KLABEL		INTEGER	F.P.	REFS	56	120	121	190
0 KLISTM		INTEGER	REFS	90	121	122	123	192
773 KOL		INTEGER	REFS	120	120	122	123	126
			DEFINED	REFS	115	120	143	3*143
			REFS	125	139	139	143	125
756 KOLUMN		INTEGER	CLIST	REFS	155	135	DEFINED	87
0 KORE		INTEGER	F.P.	REFS	56	140	39	88
0 KOUNT		INTEGER	CLIST	REFS	231	90	142	142
			REFS	231	135	140	142	142
11 KOUNTH		INTEGER	CLIST	REFS	56	103	104	105
12 KOUNTI		INTEGER	CLIST	REFS	56	103	104	105
766 KOUNTO		INTEGER	CLIST	REFS	102	103	104	105
1 KPAGE		INTEGER	REPORT	REFS	56	203	203	101
764 KP1		INTEGER	CTABLE	REFS	158	60	88	101
0 KREPOR		INTEGER	CTABLE	REFS	58	58	DEFINED	80
0 KTABLE		INTEGER	CTABLE	REFS	58	58	80	128
5 KTABLO		INTEGER	CLIST	REFS	56	132	136	137
5 KTPAGE		INTEGER	F.P.	REFS	53	152	152	139
0 KTYPE		INTEGER	PROBSZ	REFS	50	154	158	185
4 K1		INTEGER	F.P.	REFS	217	228	228	181
0 L		INTEGER	ARRAY	DEFINED	39	162	162	163
1012 LAFT		INTEGER	REFS	161	162	167	168	163
762 LAG		INTEGER	REFS	167	175	182	194	172
1004 LARK		INTEGER	REFS	174	180	213	213	166
776 LAST		INTEGER	REFS	168	168	DEFINED	162	166
1001 LATE		INTEGER	REFS	49	143	143	151	157
1053 LCOL		INTEGER	REFS	175	176	DEFINED	159	161
770 LD		INTEGER	ARRAY	REFS	164	169	170	172
761 LDLD		INTEGER	REFS	164	164	169	170	163
1000 LD1		INTEGER	REFS	172	174	182	194	160
1005 LEAST		INTEGER	REFS	174	182	194	194	166
775 LEST		INTEGER	REFS	155	202	202	202	179
2 LINES		INTEGER	CLIST	REFS	56	90	216	227
10 LINESG		INTEGER	CLIST	REFS	56	217	217	228
3 LINEST		INTEGER	CLIST	REFS	104	105	116	116
767 LOC		INTEGER	REFS	103	117	119	119	123
			REFS	103	117	119	119	123

SUBROUTINE		QCHOL		74 / 74		OPT = 1		FTN 4 . 8+577		85 / 01 / 23 . 08 . 10 . 44		PAGE	
VARIABLES		SN	TYPE	RELOCATION									
760	LOST		INTEGER										
777	LOW		INTEGER										
1060	LROW		INTEGER	ARRAY	F . P.	REFS	190	DEFINED	93	202			
0	M		INTEGER		F . P.	REFS	159	DEFINED	191	158			
0	MI		INTEGER		F . P.	REFS	49	DEFINED	143				
6	MISUM		INTEGER		PROBSZ	REFS	91	DEFINED	121				
0	ML		INTEGER		F . P.	REFS	102	DEFINED	203	205	DEFINED	39	39
0	MO		INTEGER		F . P.	REFS	104	DEFINED	104	39			
757	MP2		INTEGER		PROBSZ	REFS	53	DEFINED	205				
5	M1		INTEGER		PROBSZ	REFS	205	DEFINED	39				
0	M2		INTEGER		PROBSZ	REFS	207	DEFINED	39				
1	N		INTEGER		PROBSZ	REFS	103	DEFINED	103				
0	NAME		INTEGER	ARRAY	F . P.	REFS	53	DEFINED	91				
3	NCOLS		INTEGER		F . P.	REFS	50	DEFINED	232	39			
4	NCOLST		INTEGER		C TABLE	REFS	58	DEFINED	79				
0	NIX		INTEGER		C TABLE	REFS	58	DEFINED	39	215	223		
0	NO		INTEGER		F . P.	REFS	219	DEFINED	53				
6	NPAGE		INTEGER		CONSTS	REFS	55	DEFINED	53				
6	NPAGEA		INTEGER		CLIST	REFS	56	DEFINED	53				
1	NPASS		INTEGER		C TABLE	REFS	58	DEFINED	53				
2	NROWS		INTEGER		C TABLE	REFS	58	DEFINED	53				
0	NU		INTEGER		F . P.	REFS	77	DEFINED	78				
1007	ORIG	REAL			REFS	95	DEFINED	100	150	159			
1065	ROW	REAL		ARRAY	REFS	196	DEFINED	197	198	189			
1014	S	REAL			REFS	51	DEFINED	143	123	189			
1014	T	REAL			REFS	62	DEFINED	178	182	194	195		
0	WORST	REAL			REFS	197	DEFINED	213	198	189			
0	X	REAL		ARRAY	REFS	62	DEFINED	174	183	194			
1	YES	INTEGER			REFS	62	DEFINED	189	197	198	200	232	
EXTERNALS				TYPE	ARGS	CONSTS	REFERENCES						
ALOG10		REAL		1	LIBRARY	REFS	226						
GETROW				4		REFS	102	104					
HOTDOT				8		REFS	174	182					
MESALE				3		REFS	193	194					
PLB				3		REFS	176	233					
PROGNA				2		REFS	138						
PTABLE				3		REFS	86						
PUTROW				4		REFS	129	132					
SQRT				1		REFS	205	207					
TITLES		REAL		1	LIBRARY	REFS	200						
UNPACK				5		REFS	127	218					
						REFS	105	88					
INLINE FUNCTIONS				TYPE	ARGS	DEF LINE	REFERENCES						
ABS		REAL		1	INTRIN	REFS	1						
ABSF		REAL		1	SF	REFS	66	189					
ALOGCF				1	SF	REFS	67	226					
IABS		INTEGER		1	INTRIN	REFS	1						
IABSF		INTEGER		1	SF	REFS	68	170					
MAXO		INTEGER		0	INTRIN	REFS	170	170					
MAXOF		INTEGER		0	SF	REFS	159	159					

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
MINOF	INTEGER	2	70	
SQRTF	REAL	1	71	200

## STATEMENT LABELS

			DEF LINE	REFERENCES
623	4	FMT	237	219
633	10	FMT	239	230
0	12		85	83
646	20	FMT	241	232
104	52		115	144
105	55		116	119
112	60		120	118
123	65		126	124
165	70		141	135
15	80		81	77
207	91		150	106
0	100	INACTIVE	151	150
46	101		91	89
207	115	INACTIVE	145	111
0	120		152	151
214	130		153	2*150
0	140	INACTIVE	154	153
0	150	INACTIVE	156	155
223	160		157	2*155
225	170		158	2*153
0	180	INACTIVE	161	
0	190	INACTIVE	162	161
240	200		166	161
243	210		168	165
0	220		169	168
254	230		171	161
266	240		178	186
0	250	INACTIVE	181	2*180
311	260		187	180
0	270	INACTIVE	189	187
0	280		193	191
343	290		200	197
0	300		204	203
363	310		207	2*187
367	320		208	100
374	920		215	2*151
630	921	FMT	238	220
411	930		223	196
413	980		224	222
415	990		225	214
433	1000		232	225
720	2001	FMT	251	136
726	2002		252	139
731	2003	FMT	253	143
734	2005	FMT	254	137
LOOPS	LABEL	INDEX	FROM-TO	LENGTH
16	12	IH	83 85	14B
24	12	JH	84 85	3B
55	320	K	100 208	315B
171		KOL	143 143	12B
247	220	I	168 169	3B
323	280	I	191 193	2R

## PROPERTIES NOT INNER

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	NOT INNER
16	12	IH	83 85	14B	INSTACK	EXT REFS
24	12	JH	84 85	3B	EXT REFS	EXITS
55	320	K	100 208	315B	EXT REFS	NOT INNER
171		KOL	143 143	12B	INSTACK	INSTACK
247	220	I	168 169	3B	INSTACK	INSTACK
323	280	I	191 193	2R	INSTACK	INSTACK



1 C45700. SUBROUTINE INNER PRODUCT OF TWO VECTORS  
 C \*\*\*\*\*  
 C \*\*\* SUBROUTINE HOTDOT (LAST,INC, 'FIX', VARY, S, LOW)  
 C ,JUMP ,KENTRY )  
 C \*\*\* OBJECTIVE \*\*\*\*\*  
 C \*\*\*\* FORMS THE INNER PRODUCT OF TWO VECTORS.  
 C \*\*\* INPUT/OUTPUT \*\*\*\*\*  
 C INPUT CONSISTS OF LOCATION OF THE VECTORS AND ASSOCIATED LENGTHS.  
 C OUTPUT IS THE INNER PRODUCT.  
 C \*\*\* SUMMARY OF SYMBOLS \*\*\*\*\*  
 C -----  
 C \*\*\* ERROR MESSAGES \*\*\*\*\*  
 C -----  
 C NONE.  
 C \*\*\*\*\*  
 C SUBROUTINE HOTDOT (LAST,INC, 'FIX', VARY, S, LOW, JUMP, KENTRY)  
 C CIBM BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS  
 C DOUBLE PRECISION S  
 C IBM ENDING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS  
 C DIMENSION FIX(1)  
 C GO TO (10,20,30), KENTRY  
 C 10 CONTINUE  
 C INDEX = 1  
 C KEY = 0  
 C GO TO 99  
 C 20 CONTINUE  
 C INDEX = 1  
 C KEY = -1  
 C GO TO 99  
 C 30 CONTINUE  
 C IF (LOW - LAST) 50, 50, 120  
 C 50 IJ = INDEX + LOW - 1  
 C IF (KEY) 200, 100, 200  
 C 100 DO 110 J=LOW, LAST  
 C S = S + VARY(IJ)\*FIX(J)  
 C 110 IJ = IJ + 1  
 C 120 INDEX = INDEX + JUMP  
 C LAST = LAST + INC  
 C GO TO 99  
 C 200 DO 210 I=LOW, LAST

SUBROUTINE	HOTDOT	74/74	OPT=1		FTN 4 8+577	85/01/23 . 08.10.44	PAGE	2
60					FIX(J) = FIX(J) + VARY(IJ)*S	HOTDOT	59	
	210	IJ	*	IJ + 1		HOTDOT	60	
		GO TO	120			HOTDOT	61	
C	99	CONTINUE				HOTDOT	62	
C	RETURN					HOTDOT	63	
	END					HOTDOT	64	
65						HOTDOT	65	
						HOTDOT	66	

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

35 1 AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES						
3 HOTDOT	26	64						
VARIABLES	SN	TYPE	RELOCATION					
0 FIX	REAL	ARRAY	F.P.	REFS	32	52	58	DEFINED
71 IJ	INTEGER			REFS	52	53	58	DEFINED
0 INC	INTEGER	F.P.		REFS	55	DEFINED	26	58
67 INDEX	INTEGER			REFS	49	54	DEFINED	49
72 J	INTEGER	F.P.		REFS	52	2*58	DEFINED	53
0 JUMP	INTEGER	F.P.		REFS	54	DEFINED	51	57
0 KENTRY	INTEGER	F.P.		REFS	35	DEFINED	26	
70 KEY	INTEGER			REFS	50	DEFINED	26	
0 LAST	INTEGER	F.P.		REFS	48	51	44	55
0 LOW	REAL	F.P.		REFS	48	49	51	DEFINED
0 S	REAL	F.P.		REFS	52	58	57	26
0 VARY	REAL	ARRAY	F.P.	REFS	33	52	58	DEFINED
STATEMENT LABELS		DEF LINE	REFERENCES					
16 10		37	35					
21 20		42	35					
24 30		47	35					
0 50	INACTIVE	49	2*48					
66 99	INACTIVE	62	40					
0 100	INACTIVE	51	50					
0 110		53	51					
45 120		54	48					
52 200	*	57	2*50					
0 210		59	57					
LOOPS	LABEL	INDEX	FROM-TO	LENGTH				
40 110	J	J	51 53	4B	PROPERTIES			
61 210			57 59	3B	INSTACK			
					INSTACK			

SUBROUTINE HOTDOT    74/74    OPT=1  
STATISTICS  
PROGRAM LENGTH    76B    62  
52000B CM USED

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PAGE 3

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      SUBROUTINE TRAN   74 / 74   OPT=1

          CALL GETROW ( MATRIX,
  1        CONTINUE
          CALL DVALUE ( BUFFER,
          ASSIGN 24 TO IREAD
          ASSIGN 70 TO IWRITE
          IROW = 1
          ISTART = IROW + 1
          NRDW=0
          IO=MTEMP1+MTEMP2
          MOUT=MTEMP1
          LOCEMP=ISIZE-IROW
          INDEX=ISTART

  60      C
          C BEGIN READING ROWS OF THE MATRIX AND JUNITF ARE THE
          C MATRIX AND JUNITF ARE THE
          C
  65      C
          C
          C
          C
          C
          C
  70      C
          C
          C
          C
          C
          C
  75      C
          C
          C
          C
          C
          C
          C
  80      C
          C
          C
          C
          C
          C
  85      C
          C
          C
          C
          C
          C
  90      C
          C
          C
          C
          C
          C
  95      C
          C
          C
          C
          C
          C
 100     C
          C
          C
          C
          C
          C
 105     C
          C
          C
          C
          C
          C
 110     C
          C
          C
          C
          C
          C

```

FTN 4 8+577

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```

115      26 CALL GETROW(MIN,1,BUFFER,IROW)          116
      3C INDEX=ISTART                           TRAN
      DO 65 NROW=JROW,KROW                      TRAN
      INX=INDEX+2                                TRAN
      IPT=IBUFF(INDEX+1)                         TRAN
      IF (IPT) 55, 35,35                         119
      CONTINUE
      C   IPT IS POINTING TO DATA                120
          BUFFER(NROW)=BUFFER(IPT)
          IPT=IPT+1
          JPT=IBUFF(INX)
          IF (JPT) 40, 50,50
          CONTINUE
          C   JPT IS POINTING TO A COUNT OTHER THAN THE FIRST 121
          IPT=-JPT
          42 IF (IPT.LE.(JPT+IBUFF(JPT))) GO TO 45
          43 IBUFF(INDEX+1)=-IPT
          IBUFF(INX)=-IPT
          GO TO 65
          45 IBUFF(INDEX+1)=IPT
          GO TO 65
          50   CONTINUE
          C   JPT IS FIRST COUNT
          IPT=INX
          GO TO 42
          55   CONTINUE
          C   IPT IS POINTING TO A COUNT
          IPT=-IPT
          IF (IBUFF(IPT)) 58, 62,62
          58 BUFFER(NROW)=0
          IBUFF(IPT)=IBUFF(IPT)+1
          IF (IBUFF(IPT)) 65,60, 60
          60 IPT=IPT+1
          GO TO 43
          62 IF (IPT.NE.INX) IBUFF(INX)=-IPT
          IPT=IPT+1
          GO TO 35
          65 INDEX=IBUFF(INDEX)
          C   LOOP ENDING AT 65 GENERATES ALL OR PART OF A ROW OF ANSWER 122
          GO TO IWRITE,(70,80)
          70 CALL PUTROW(MOUT,1,BUFFER,IROW)
          IF (NCOL.LT.ICOL) GO TO 22
          C   WRITING AN END OF FILE AND USING FILTAP MAY BE INEFFICIENT 123
          IF (JROW.GT.1) CALL DCLOSE(MIN)
          MIN=MOUT
          ASSIGN 26 TO IREAD
          MOUT=IO-MIN
          NFMIN = IPDS(MIN)
          CALL GEDLAB(8HTRAN) O2,MIN ,NAME1 ,NFMIN ,J ,L )
          NROW=KROW
          INDEX=ISTART
          LOCMP=ISIZE-IROW
          CALL PUTROW(MANS,1,BUFFER,IROW)
          IF (ICOL.LT.ICOL) GO TO 22
          80   CONTINUE
          CALL PUTROW(MANS,1,BUFFER,IROW)
          IF (ICOL.LT.ICOL) GO TO 22
          170

```

EXTERNALS	ROUTINE	QPASS	74/74	OPT=1
GETROW	TYPE	ARGS	4	REFERENCES 36
STATEMENT	LABELS	INACTIVE	DEF LINE 35 36 37	REFERENCES 34 35 2•34
0	100			
0	110			
20	120			
LOOPS	LABEL	INDEX	FROM-TO 35 36	LENGTH 7B
1	110	I		
STATISTICS	PROGRAM LENGTH		35B	29
	52000B CM USED			

PAGE 2

FIN 4.8+577

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SYMBOLIC REFERENCE MAP ( $B=3$ )

ENTRY POINTS	DEF LINE	REFERENCES	
3 QPASS	28	37	
VARIABLES	SN	TYPE	LOCATION
30 I	*	INTEGER	F.P.
0 ML		INTEGER	F.P.
31 N	*	INTEGER	F.P.
27 NEW		INTEGER	F.P.
0 NU		INTEGER	F.P.
0 T		REAL	F.P.
0 A		ARRAY	F.P.

DEFINED	35		28
S	36	DEFINED	
S	36		28
S	34	DEFINED	
S	33		28
S	32	DEFINED	
S	31		28

STATEMENT	LABELS	QFOR	74/74	OPT = 1
O 200		INACTIVE	90	89
215 220			92	62
O 230		INACTIVE	94	2*89

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS	NOT INNER
20	100	I	48 51	21B	INSTACK		
33	100	J	50 51	2B			
42	140	K	52 59	17B	NOT INNER		
46	130	I	54 58	10B	OPT	EXITS	
65	220	I	62 92	133B	INSTACK	EXT REFS	NOT INNER
102	146	J	65 66	2B			
142	180	K	75 84	30B	INSTACK	EXT REFS	
200	190	K	85 86	2B			

STATISTICS	PROGRAM LENGTH	404B	260
	52000B CM USED		

SUBROUTINE QFOR		74/74	OPT=1	RELOCATION		FTN 4.8+577		85/01/23 . 08 . 10 . 44		PAGE	3
VARIABLES	SN	TYPE				REFS	DEFINED	47	91		
307 JOLT	K	INTEGER	INTEGER			REFS	53	56	76		
312 KOUNT	L	INTEGER	INTEGER	ARRAY	F.P.	DEFINED	52	75	85		2*86
316 KOUNT	M	INTEGER	INTEGER	ARRAY	F.P.	REFS	67	68	70		
306 LAST	N	INTEGER	INTEGER			REFS	36	53	77	DEFINED	56
305 LATE	O	INTEGER	INTEGER			REFS	63	81	89	93	DEFINED
320 LEAD	P	INTEGER	INTEGER			REFS	46	74	78	DEFINED	45
323 LEAST	Q	INTEGER	INTEGER			REFS	70	74			
326 LK	R	INTEGER	INTEGER			REFS	72	79	DEFINED	78	
317 LOC	S	INTEGER	INTEGER			REFS	78	70	77	DEFINED	
325 LOW	T	INTEGER	INTEGER			REFS	69	70	70	DEFINED	68
0 M	U	INTEGER	INTEGER			REFS	78	74	74	DEFINED	
304 MADZ	V	INTEGER	INTEGER			REFS	43	53	62	DEFINED	29
0 MI	W	INTEGER	INTEGER			REFS	46	48	54	DEFINED	44
0 MIDZ	X	INTEGER	INTEGER			REFS	49	64	64	DEFINED	
0 ML	Y	INTEGER	INTEGER			REFS	36	44	71	72	79
0 MO	Z	INTEGER	INTEGER			DEFINED	29				
303 MP2	A	INTEGER	INTEGER			REFS	67	69	DEFINED	29	
0 N	B	INTEGER	INTEGER			REFS	90	90	90	DEFINED	
0 NU	C	REAL	REAL			REFS	68	68	68	DEFINED	
327 R	D	REAL	REAL			REFS	60	60	60	DEFINED	
322 S	E	REAL	REAL	ARRAY	F.P.	REFS	49	50	52	64	65
0 T	F	REAL	REAL			DEFINED	29				
324 X	G	REAL	REAL	ARRAY	F.P.	REFS	45	62	72	79	75
0 Z	H	REAL	REAL	ARRAY	F.P.	REFS	82	83	83	DEFINED	85
EXTERNALS	I	TYPE	ARGS	REFERENCES		REFS	72	79	80	DEFINED	
GETROW	J		4	49		REFS	79	79	80	DEFINED	
HOTDOT	K		8	72		REFS	76	76	76	DEFINED	
PUTROW	L		4	87		REFS	51	64	66	DEFINED	
UNPACK	M		5	70		REFS	73	79	87	DEFINED	
INLINE FUNCTIONS	N	TYPE	ARGS	REFERENCES		REFS	73	73	73	DEFINED	
MAXO	O	INTEGER	0	49		REFS	55	72	72	76	
MAXOF	P	INTEGER	2	64		REFS	51	64	66	69	
MINO	Q	INTEGER	0	72		REFS	74	74	74	DEFINED	
MINOF	R	INTEGER	2	79		REFS	71	71	71	DEFINED	
STATEMENT LABELS	S	DEF LINE	REFERENCES			REFS	78	78			
0 100	T	51	48	50		REFS	53				
0 110	U	54	53			REFS	2*55				
0 120	V	56	54			REFS	67				
53 130	W	58	55			REFS	67				
56 140	X	59	52			REFS	2*53				
0 143	Y	64	63			REFS	66				
0 146	Z	66	65			REFS	67				
105 150	A	67	65			REFS	2*63				
0 160	B	82	81			REFS	2*81				
164 170	C	83	81			REFS	84				
0 180	D	84	75			REFS	85				
0 190	E	86	85			REFS					

```

130 CONTINUE
140 CONTINUE
   IT = M2
   IN = 1
   DO 220 I = NU,M
      IF (I - LAST) 150,150,143
143 CALL GETROW (MI,1,T,N)
   DO 146 J = 1,N
146 Z(IN,J) = T(J)
150 CALL GETROW (ML,-1,DUMMY,KOUNT)
   LOC = MP2 - KOUNT
   CALL GETROW (ML,O,T(LOC),KOUNT)
   CALL UNPACK(T(LOC),KOUNT,T,I,LEAD)
   IN1 = MINOF(IN,MIDZ) - 1
   CALL HOTDOT (IN1,O,T(NU),Z,S,LEAST,MIDZ,1)
   X = T(I)
   LOW = MAXOF(O,LEAD-LATE) + 1
   DO 180 K = 1,N
      S = -Z(IN,K)
      LK = L(K)
      LEAST = MAXOF(LOW,LK-LATE)
      CALL HOTDOT (IN1,O,T(NU),Z,S,LEAST,MIDZ,3)
80   R = -S
      IF (I - LAST) 160,160,170
160 R = R / X
170 Z(IN,K) = R
180 CONTINUE
   DO 190 K = 1,N
190 T(K) = Z(IN,K)
   CALL PUTROW (IT,1,T,N)
   IN = IN + JOLT
   IF (I - LAST) 220,200,220
200 IT = MO
   JOLT = 0
220 CONTINUE
   NU = LAST + 1
230 RETURN
END
95

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFS	RELOCATION	REFS	DEFINED	REFERENCES	REFS	DEFINED	REFERENCES
3	QFOR	29	94		51	48	55	56	54	63
315	DUMMY	*	REAL		REFS	REFS	67	63	62	70
310	I		INTEGER		REFS	REFS	66	71	76	83
314	IN		INTEGER		DEFINED	DEFINED	61	88	79	86
321	IN1		INTEGER		REFS	REFS	72	79	DEFINED	71
313	IT		INTEGER		REFS	REFS	87	DEFINED	60	90
311	J		INTEGER		REFS	REFS	2*51	DEFINED	50	65

```

1      C45700. SUB. QFOR (COMPUTE THE FORWARD SOLUTION OF TRIANGULAR MATRIX)      2
C      *****                                                               *****      2
C      *****                                                               *****      3
C      ***** SUBROUTINE QFOR (T      'Z      'L      'M      'N      ,NU)      4
C      *****      ,MIDZ   ,ML    ,MZ    ,MI    ,MO)      5
C      *****                                                               *****      5
C      *****      OBJECTIVE      *****      6
C      *****      *****      *****      *****      6
C      *****      COMPUTES THE FORWARD SOLUTION OF L TRANSPOSE TIMES X = L INVERSE *      7
C      *****      TIMES Y = Z. IT IS CALLED BY QFSOL EVERY TIME THAT THE AVAILABLE *      7
C      *****      CORE MUST BE ZONED.      *****      7
C      *****      *****      *****      *****      7
C      ***** INPUT/OUTPUT      *****      *****      *****      *****      8
C      *****      *****      *****      *****      8
C      *****      THIS SUBROUTINE USES THE LOWER TRIANGLE DECOMPOSITION OF THE      9
C      *****      TOTAL STIFFNESS MATRIX, RESIDING ON ML, AND THE APPLIED LOADS ON *      9
C      *****      MY, TO PRODUCE THE INTERMEDIATE Z MATRIX ON MZ.      *      9
C      *****      *****      *****      *****      9
C      ***** SUMMARY OF SYMBOLS      *****      *****      *****      *****      10
C      *****      *****      *****      *****      10
C      *****      ERROR MESSAGES      *****      *****      *****      *****      11
C      *****      *****      *****      *****      11
C      *****      NONE.      *****      *****      *****      *****      12
C      *****      *****      *****      *****      12
C      *****      *****      *****      *****      12
C      *****      SUBROUTINE QFOR (T,Z,L,M,N,NU,MIDZ,ML,MZ,MI,MO)      13
C      *****      *****      *****      *****      13
C      *****      CIBM BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      14
C      *****      DOUBLE PRECISION S      *****      *****      *****      14
C      *****      CIBM ENDING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      15
C      *****      DIMENSION T(1),Z(MIDZ,1),L(1)      15
C      *****      *****      *****      *****      15
C      *****      *****      *****      *****      15
C      *****      FUNCTION DEFINITION      *****      *****      *****      16
C      *****      MAXOF(I,J)      =      MAXO(I,J)      16
C      *****      MINOF(I,J)      =      MINO(I,J)      16
C      *****      *****      *****      *****      16
C      *****      MP2 = M + 2      *****      *****      *****      17
C      *****      MADZ = MIDZ - 1      *****      *****      17
C      *****      LATE = NU - 1      *****      *****      17
C      *****      LAST = MADZ + LATE      *****      *****      17
C      *****      JOLT = 1      *****      *****      17
C      *****      DO 100 I = 1, MADZ      *****      *****      18
C      *****      CALL GETROW (MI, 1, T, N)      *****      *****      18
C      *****      DO 100 J = 1, N      *****      *****      18
C      *****      100 Z(I,J) = T(J)      *****      *****      18
C      *****      DO 140 K = 1, N      *****      *****      18
C      *****      IF (L(K) - M) 140, 140, 110      *****      *****      18
C      *****      DO 130 I = 1, MADZ      *****      *****      18
C      *****      IF (Z(I,K)) 120, 130, 120      *****      *****      18
C      *****      120 L(K) = I      *****      *****      18
C      *****      *****      *****      *****      18

```





```

115      940 IND=37          QFSOL   116
        LAFT=LINE$-KOUNT    QFSOL   117
        IF(LAFT.LT.2) KOUNT=LINE$  QFSOL   118
        CALL TITLES(2)       QFSOL   119
        WRITE(ITAPEW,4) IND   QFSOL   120
        KOUNT=KOUNT+2        QFSOL   121
120
        1000 CONTINUE        QFSOL   122
        CALL DCLOSE (ML)     QFSOL   123
        CALL DCLOSE (MY)     QFSOL   124
        CALL DCLOSE (MZ)     QFSOL   125
        CALL DCLOSE (M1)     QFSOL   126
        CALL DCLOSE (M2)     QFSOL   127
        CALL TIMEB (10,10HFROM QFSOL) QFSOL   128
        CALL MESSAGE (2, 5, 5HQFSOL) QFSOL   129
        QFSOL   130
C      FORMAT STATEMENTS
C      4 FORMAT(/,10X,10(1H*)) 5SHERRR,14,10(1H*)
C      5 FORMAT(/,10X, 36HTOTAL MATRIX EXCEEDS STORAGE IN CORE)
C
        C      RETURN
        END
135
137

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	
3 QFSOL	34	135	
VARIABLES	SN	TYPE	RELOCATION
351	BLANK	REAL	REFS
422	I	INTEGER	REFS
0	IDIV	INTEGER	CIDIV
432	IND	INTEGER	REFS
416	IO	INTEGER	REFS
0	IPOS	INTEGER	ARRAY
2	ITAPEP	INTEGER	FILE
0	ITAPER	INTEGER	COMRWP
1	ITAPEW	INTEGER	COMRWP
7	KBPAGE	INTEGER	CLIST
4	KLABEL	INTEGER	CLIST
0	KORE	INTEGER	F.P.
0	KOUNT	INTEGER	CLIST
11	KOUNTH	INTEGER	CLIST
12	KOUNTI	INTEGER	CLIST
1	KPAGE	INTEGER	CLIST
425	KR	INTEGER	REFS
5	KTPAGE	INTEGER	CLIST
427	LAFT	INTEGER	REFS
413	LARGE	INTEGER	REFS
414	LEAVE	INTEGER	REFS
415	IFFT	INTEGER	RFFS
			DEFINED
			86
			DEFINED
			94
			109
			116
			117
			120
			121
			122
			123
			124
			125
			126
			127
			128
			129
			130
			131
			132
			133
			134
			135
			136
			137

SUBROUTINE QFSOL 74/74 OPR=1

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```
CALL PROGNA (4H(QFS,4HOL)) ) MANAGES FORWARD SOLUTION)      59
CALL MESAGE (1 32, 32HQFSOL -                                     GFSOL
CALL TIMEB (11,11HFROM QFSOL )                                     GFSOL
DATA BLANK /4H/                                                 GFSOL
DATA MATNAN/4HZ-MA .4HTRIX/                                         GFSOL
DATA MATNAP/4HSCKRA .4HTCH1/                                         GFSOL
NFILML = IPOS(ML)                                                 GFSOL
CALL GEDLAB (BHQSOL 01,ML,MATNAM,NFILML,M ,MC)                  GFSOL
NFILMV = IPOS(MY)                                                 GFSOL
CALL GEDLAB (BHQSOL 02,MY,NAME1 ,NFILMV,MR,N )                  GFSOL
IF (IABSF (M-8192) - 8192) 40, 940, 940                           QFSOL
40 IF (M - MC) 940,50,940                                         GFSOL
50 IF (M - MR) 940,60,940                                         GFSOL
60 IF (N) 940,940,70                                           GFSOL
70 LARGE = MAXOF (M,N) + 2                                         GFSOL
LEAVE = KORE - N/IDIV                                             GFSOL
LEFT = LEAVE - LARGE - N                                         GFSOL
IF (LEFT - N) 920,100,100                                         GFSOL
100 IO = M1 + M2                                                 GFSOL
MI = MY                                                       GFSOL
MO = M1                                                       GFSOL
NU = 1                                                       GFSOL
DO 110 I = LEAVE,KORE                                         GFSOL
110 T(I) = BLANK                                              GFSOL
LOVE = LEFT / N                                               GFSOL
LEFT = M                                                       GFSOL
NFILMZ = IPOS(MZ)                                                 GFSOL
CALL PUDLAB (BHQSOL 01,MZ,MATNAN,NFILMZ,M ,N )                 GFSOL
120 KR = MINOF(LEFT,LOVE)                                         GFSOL
MR = KR + 1                                                       GFSOL
NFILMO = IPOS(MO)                                                 GFSOL
CALL PUDLAB (BHQSOL 02,MO,MATNAP,NFILMO,M ,N )                 GFSOL
C ACTUAL COMPUTATION OF THE FORWARD SOLUTION                   GFSOL
CALL QFOR (T,T(LARGE),T(LEAVE),M,N,NU,MR,ML,MZ,MI,MO)          GFSOL
130 LEFT = LEFT - KR                                            GFSOL
IF (LEFT) 140,160,140                                         GFSOL
140 LAFT=LINE$-KOUNT                                         GFSOL
IF(LAFT.LT.2) KOUNT=LINE$                                     GFSOL
CALL TITLES(2)                                                 GFSOL
WRITE(ITAPEW,5)                                                 GFSOL
KOUNT=KOUNT+2                                                 GFSOL
MI = MO                                                       GFSOL
MO = IO - MI                                                 GFSOL
NFILMI = IPOS(MI)                                                 GFSOL
CALL GEDLAB (BHQSOL 03,MI,MATNAP,NFILMI,MC,NC)                  GFSOL
NFILML = IPOS(ML)                                                 GFSOL
CALL GEDLAB (BHQSOL 04,ML,MATNAM,NFILML,MC,NC)                  GFSOL
CALL QPASS (NU,ML,T)                                             GFSOL
GO TO 120                                                       GFSOL
160 GO TO 1000                                                 GFSOL
920 IND=53                                                 GFSOL
LAFT=LINE$-KOUNT                                         GFSOL
IF(LAFT.LT.2) KOUNT=LINE$                                     GFSOL
CALL TITLES(2)                                                 GFSOL
WRITE(ITAPEW,4) IND                                         GFSOL
COUNT=COUNT+2                                                 GFSOL
ON TO 1000~                                                 GFSOL
```

74/74 OPT=1

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```
1 C45700, SUB. QFSOL (MANAGES ZONING FOR FORWARD SOLUTION OF TRIANG. M.) QFSOL
C ***** QFSOL 2
C ***** QFSOL 3
C **** SUBROUTINE QFSOL (ML ,MY ,MZ ,M1 ,M2) ***** QFSOL 4
C **** ***** QFSOL 5
C **** ***** QFSOL 6
C **** ***** QFSOL 7
C **** ***** QFSOL 8
C **** ***** QFSOL 9
C **** ***** QFSOL 10
C **** ***** QFSOL 11
C **** ***** QFSOL 12
C **** ***** QFSOL 13
C **** ***** QFSOL 14
C **** ***** QFSOL 15
C **** ***** QFSOL 16
C **** ***** QFSOL 17
C **** ***** QFSOL 18
C **** ***** QFSOL 19
C **** ***** QFSOL 20
C **** ***** QFSOL 21
C **** ***** QFSOL 22
C **** ***** QFSOL 23
C **** ***** QFSOL 24
C **** ***** QFSOL 25
C **** ***** QFSOL 26
C **** ***** QFSOL 27
C **** ***** QFSOL 28
C **** ***** QFSOL 29
C **** ***** QFSOL 30
C **** ***** QFSOL 31
C **** ***** QFSOL 32
C **** ***** QFSOL 33
C **** ***** QFSOL 34
C **** ***** QFSOL 35
C **** ***** QFSOL 36
C **** ***** QFSOL 37
C **** ***** QFSOL 38
C **** ***** QFSOL 39
C **** ***** QFSOL 40
C **** ***** QFSOL 41
C **** ***** QFSOL 42
C **** ***** QFSOL 43
C **** ***** QFSOL 44
C **** ***** QFSOL 45
C **** ***** QFSOL 46
C **** ***** QFSOL 47
C **** ***** QFSOL 48
C **** ***** QFSOL 49
C **** ***** QFSOL 50
C **** ***** QFSOL 51
C **** ***** QFSOL 52
C **** ***** QFSOL 53
C **** ***** QFSOL 54
C **** ***** QFSOL 55
C **** ***** QFSOL 56
C **** ***** QFSOL 57
C **** ***** QFSOL 58

1 C FUNCTION DEFINITION
C TABSF(I) = TABS(I)
C MAXOF(I,J) = MAXO(I,J)
C MINOF(I,J) = MINO(I,J)

40 C DATA INITIALIZATION
```

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SUBROUTINE TRAN

STATEMENT LABELS		74/74 OPT=1		DEF LINE REFERENCES	
0	25			113	112
163	26			115	111
166	30			116	114
175	35	INACTIVE		121	2*120
0	40			127	126
204	42			130	139
207	43			131	148
213	45			134	130
216	50			136	2*126
220	55	INACTIVE		140	120
0	58	INACTIVE		144	143
0	60	INACTIVE		147	2*146
226	62			149	2*143
233	65			152	117
241	70			155	62
270	80			169	105
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
66	7	KA	79 80	3B	INSTACK
160	25	J	112 113	2B	INSTACK
171	65	NROW	117 152	46B	
COMMON BLOCKS	CLIST	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
		11	O KOUNT (1)	1 KPAGE (1)	2 LINES (1)
			3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)
			6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)
			9 KOUNTH (1)	10 KOUNTI (1)	
FILE		20	O IPUS (20)		
STATISTICS					
PROGRAM LENGTH			626B	406	
CM LABELED COMMON LENGTH			37B	31	
52000B CM USED					

SUBROUTINE	TRAN	74/74	OPT=1		FTN 4.8+577	85/01/23. 08.10.44	PAGE	5
VARIABLES				RELOCATION				
12 KOUNT1	INTEGER			CLIST	REFS	42		
1 KPAGE	INTEGER			CLIST	REFS	42		
536 KROW	INTEGER			CLIST	REFS	101	117	164
5 KTPAGE	INTEGER			CLIST	REFS	42		
547 L *	INTEGER			CLIST	REFS	163		
2 LINES	INTEGER			CLIST	REFS	42		
10 LINESG	INTEGER			CLIST	REFS	42		
3 LINEST	INTEGER			CLIST	REFS	42		
525 LOCEMP	INTEGER			F..P.	REFS	89	93	167
0 LSIZE	INTEGER			F..P.	REFS	36	38	60
0 MANS	INTEGER			F..P.	REFS	106	107	174
0 MATRIX	INTEGER			DEFINED	REFS	32	52	32
543 MIN	INTEGER			F..P.	REFS	53	54	56
524 MOUT	INTEGER			F..P.	REFS	77	82	91
0 MTEMP1	INTEGER			F..P.	REFS	115	158	162
0 MTEMP2	INTEGER			DEFINED	REFS	159	159	163
556 NAME	INTEGER			DEFINED	REFS	102	103	161
0 NAME1	INTEGER			ARRAY	REFS	66	67	67
560 NAME1	INTEGER			ARRAY	REFS	66	175	32
541 NCOL	INTEGER			ARRAY	REFS	40	176	32
540 NFMANS	INTEGER			ARRAY	REFS	40	54	103
511 NFMAT	INTEGER			ARRAY	REFS	40	107	32
546 NFMIN	INTEGER			ARRAY	REFS	110	156	171
537 NFMDOUT	INTEGER			ARRAY	REFS	107	107	109
514 NIGEO *	INTEGER			INTEGER	REFS	54	54	110
6 NPAGE	INTEGER			INTEGER	REFS	163	163	162
522 NROW	INTEGER			INTEGER	REFS	103	103	102
515 NSGED	INTEGER			INTEGER	REFS	56	56	
EXTERNALS				INTEGER	REFS	42	97	109
DCLOSE				INTEGER	REFS	97	98	123
DVALUE				INTEGER	REFS	65	97	165
GEDLAB				INTEGER	REFS	57	58	
GETROW				INTEGER	REFS	174	175	176
MESSAGE				INTEGER	REFS	173	173	
PROGNA				INTEGER	REFS	60	60	
PUDLAB				INTEGER	REFS	54	163	
PUTROW				INTEGER	REFS	56	57	
TIMEB				INTEGER	REFS	50	178	
STATEMENT LABELS				REFERENCES	REFS	49	99	144
36 1				REFERENCES	REFS	103	107	
54 2				REFERENCES	REFS	51	170	
0 4				REFERENCES	REFS	51	177	
141 6				REFERENCES	REFS	80	79	
0 7				REFERENCES	REFS	108	104	
150 8				REFERENCES	REFS	75	84	
72 10				REFERENCES	REFS	102	101	
100 11				REFERENCES	REFS	85	82	
107 12				REFERENCES	REFS	90	2*89	
131 20				REFERENCES	REFS	99	89	
151 22				REFERENCES	REFS	110	156	
154 24				REFERENCES	REFS	112	61	

```

SUBROUTINE TRAN      74/74    OPT=1
                                         FTN 4.8+577
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                                         PAGE   4

          CALL PUTROW(MANS,O,O,O)                      TRAN 173
          CALL DCLOSE (MATRIX)                         TRAN 174
          CALL DCLOSE (MANS)                          TRAN 175
          CALL DCLOSE (MTEMP1)                         TRAN 176
          CALL DCLOSE (MTEMP2)                         TRAN 177
          CALL TIMEB (9,9HFROM TRAN)                  TRAN 178
          CALL MESSAGE (2, 4, 4HTRAN)                 TRAN 179
          RETURN                                     TRAN 180
          END                                         TRAN 182

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REF LINE	REFERENCES
3 TRAN	32	180	
VARIABLES	SN	TYPE	RELOCATION
0 BUFFER		REAL	ARRAY F.P.
532 DUMMY	*	REAL	ARRAY F.P.
0 IBUFF		INTEGER	ARRAY F.P.
513 ICOL		INTEGER	REFS 36 58
533 ICOUNT		INTEGER	REFS 32 60
535 ICT2		INTEGER	REFS 113 123
526 INDEX		INTEGER	REFS 144 144
534 INX		INTEGER	REFS 88 91
523 IO		INTEGER	REFS 95 119
0 IPOS		INTEGER	REFS 32 94
544 IPT		INTEGER	REFS 145 125
516 IREAD		INTEGER	REFS 103 107
512 IROW		INTEGER	REFS 90 107
510 IIZE		INTEGER	REFS 94 156
521 ISTART		INTEGER	REFS 90 156
517 IWRITE		INTEGER	REFS 94 156
542 J		INTEGER	REFS 90 156
545 JPT		INTEGER	REFS 90 156
520 JROW		INTEGER	REFS 90 156
0 JUNITF		INTEGER	REFS 90 156
531 KA		INTEGER	REFS 90 156
7 KBPAGE		INTEGER	REFS 90 156
550 KFMIG		INTEGER	REFS 90 156
527 KFMIGX		INTEGER	REFS 90 156
530 KFMIGX		INTEGER	REFS 90 156
4 KLABEL		INTEGER	REFS 90 156
0 KOUNT		INTEGER	REFS 90 156
11 KOUNTU		INTEGER	REFS 90 156

OPT = 1

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C45700 SUR REVERS (PEVEDSE THE ORDER OF A MATRIX ON TAPE)

```

2      REVERS 3
C      REVERS 4
C      REVERS 5
C      REVERS 6
C      REVERS 7
C      REVERS 8
C      REVERS 9
C      REVERS 10
C      REVERS 11
C      REVERS 12
C      REVERS 13
C      REVERS 14
C      REVERS 15
C      REVERS 16
C      REVERS 17
C      REVERS 18
C      REVERS 19
C      REVERS 20
C      REVERS 21
C      REVERS 22
C      REVERS 23
C      REVERS 24
C      REVERS 25
C      REVERS 26
C      REVERS 27
C      REVERS 28
C      REVERS 29
C      REVERS 30
C      REVERS 31
C      REVERS 32
C      REVERS 33
C      REVERS 34
C      REVERS 35
C      REVERS 36
C      REVERS 37
C      REVERS 38
C      REVERS 39
C      REVERS 40
C      REVERS 41
C      REVERS 42
C      REVERS 43
C      REVERS 44
C      REVERS 45
C      REVERS 46
C      REVERS 47
C      REVERS 48
C      REVERS 49
C      REVERS 50
C      REVERS 51
C      REVERS 52
C      REVERS 53
C      REVERS 54
C      REVERS 55
C      REVERS 56
C      REVERS 57
C      REVERS 58

2      REVERS (REVERSE THE ORDER) OF A MATRIX ON TAPE
C
C*** SUBROUTINE REVERS (MAT1 ,MAT2) *****
C*** COMPUTER VERSION *****
C*** IGM ... AS IS.
C*** CDC ... AS IS.
C*** OBJECTIVE *****
C*** USED TO REVERSE THE ORDER OF A MATRIX ON A TAPE WHEN THE MATRIX
C WILL NOT FIT IN CORE. THE SUBROUTINE READS THE MATRIX INTO THE
C ARRAY BUFFER. WHEN THE ARRAY IS FULL, THE SUBROUTINE KEEPS
C READING THE MATRIX IN, PUTTING THE NEW ROWS INTO BUFFER ON TOP
C OF THE OLD ROWS UNTIL ALL THE MATRIX IS READ IN. AT THIS TIME
C THE ARRAY WILL CONTAIN THE END OF THE MATRIX WHICH IS THEN
C WRITTEN OUT IN REVERSE ORDER ONTO TAPE MAT2. THE FIRST MATRIX
C IS THEN AGAIN READ IN UNTIL THE LAST ROW READ ONTO MAT2 IS
C REACHED. THEN THE PORTION OF THE MATRIX IN BUFFER IS READ OUT
C BACKWARDS ONTO MAT2. THIS CONTINUES UNTIL ALL THE MATRIX ON MAT1
C HAS BEEN REVERSED AND PUT ON MAT2.
C*** INPUT/OUTPUT *****
C*** THE SUBROUTINE USES A MATRIX ON TAPE MAT1 AS INPUT, AND PUTS OUT *
C THE SAME MATRIX IN REVERSE ORDER ON MAT2.
C*** SUMMARY OF SYMBOLS *****
C*** ERROR MESSAGES *****
C*** NONE.
C*** SUBROUTINE REVERS (ISIZE,BUFFER,IBUFF,MAT1,MAT2,NAME)
C*** INTEGER YES
C
C      DIMENSION IBUFF(ISIZE)          ,IPOS(20)
C      DIMENSION BUF(300)             ,BUFFER(ISIZE)
C      DIMENSION MATNAME(2)
C      DIMENSION NAME(2)
C
C      COMMON /CLUE/IANL,MAXAN,JCORN,KLU,INVER,KLT1,MAXAN1,
C      1      NOWARP,NOBEAM,MCROW,JDDEF,
C      COMMON /COMWRP/ ITAPER,ITAPEW,ITAPEP
C      COMMON /CLIST/ KOUNT,KPAGE,LINE5,LINEST,KLABEL,KTPAGE,NPAGE
C      1      KBPAGE,LINEQS,KOUNTH,KOUNTI
C      COMMON /CONSTS/ NO ,YES
C      COMMON /FILE / IPOS

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SUBROUTINE REVERS      74/74    OPT=1          FTN 4.8+577   85/01/23. 08. 10.44   PAGE 2
C DATA INITIALIZATION
C
60   CALL FROGNA (4H(REV,4HERS))
       CALL MESSAGE (1,32,32HREVERS - REVERSE ORDER OF MATRIX)
       CALL TIMEB (11,1HFROM REVERS)
       DATA NAME/4HDEFL/
1     NFMAT1 = IPOS(MAT1)
       CALL GEDLAB (BHREVERSO1,MAT1,MATNAME,NFMAT1,IROW,ICOL)
       NFMAT2 = IPOS(MAT2)
       CALL PUDLAB (GHREVERS,MAT2,NAME,NFMAT2,IROW,ICOL)
       ICOUNT = 0
       IROW=IROW
COMMENT***THE CODE TO READ IN THE FIRST CORE LOAD IN EACH PASS***

20   JROW1=1
       JPT1=1
       KROW2=0
       LOCEMP=1SIZE
       NROW=0
       NPT=0
       INDEX=1
22   CALL GETROW (MAT1,-1,DUMMY,ICT)
       IF ((ICT+3).GT.LOCEMP) GO TO 28
       CALL GETROW (MAT1,O,BUFFER(INDEX+2),ICT)
       ICT2=ICT+2
       IBUFF(INDEX+1)=NPT
       NPT=INDEX
       IBUFF(INDEX)=INDEX+ICT2
       INDEX=IBUFF(INDEX)
       LOCEMP=LOCEMP-1CT2
       NROW=NROW+1
       IF (NROW-LROW) 22,50,050
28   CONTINUE
COMMENT***THE CODE TO GET THE NEEDED LAST ROWS INTO CORE***

90   KPT1=NPT
       KROW1=NROW
       LOCEMP=1SIZE
       INDEX=1
       JROW2=NROW+1
       JPT2=1
       NPT=0
       ASSIGN 34 TO ISW
C           READ TO READ IN MORE ROWS OVER THOSE WE ALREADY HAVE
100  GO TO 32
       30  CALL GETROW (MAT1,-1,DUMMY,ICT)
       IF ((ICT+3).GT.LOCEMP) GO TO 48
       32  INDEX=INDEX+ICT+3
       GO TO ISW,(34,40)
C           KEEP TRACK OF HOW MANY ROWS FROM PREVIOUS PASS WE WILL ^CLOBBER
C           UNLESS WE HAVE ALREADY CLOBBERED THEM ALL
       34  JROW1=JROW1+
           IF (JROW1.GT.KROW1) GO TO 45
           JPT1=IBUFF(JPT1)
           IF ((JPT1-INDEX) 34,40,40
       40  CALL GETROW (MAT1,O,BUFFER(INDEX+2),ICT)
           IBUFF(INDEX+1)=NPT
           INDEX=INDEX+1

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SUBROUTINE REVERS      74/74    OPT=1          FTN 4.8+577   85/01/23. 08.10.44   PAGE 3

115      IBUFF(INDEX)=JINDEX
         INDEX=JINDEX
         LOCEMP=LOCEMP-ICT-2
         NROW=NROW+1
         IF (NROW-LROW) 30,52,052
120      45 ASSIGN 40 TO ISW
         KROW1=O
         C       SIGNAL COMPLETE DESTRUCTION OF PREVIOUS PASS
             GO TO 40
125      48 JROW1=JROW2
         JPT1=JPT2
         C       REINITIALIZE FOR ANOTHER PASS
             GO TO 28
130      50 KROW1=LROW
         KPT1=NPT
         GO TO 55
135      52 KROW2=LROW
         KPT2=NPT
         C       CONTINUE
         LAST UNWRITTEN ROWS OF MATRIX ARE IN CORE
         KROW1=0 MEANS FIRST PART IS NULL
         KROW2=0 MEANS SECOND PART IS NULL
         C       IF (KROW2.EQ.0) GO TO 72
             KPT=KPT2
             NROW=KROW2
             JROW=JROW2
             NPT=KPT
140      62 IF (NROW-JROW) 70,66,66
             64 IF (NROW-JROW) 70,66,66
             66 ICT=IBUFF(NPT)-NPT-2
                 CALL PUTROW(MAT2,O,BUFFER(NPT+2),ICT)
145      ICOUNT = ICOUNT + 1
         IF (MATNAME(1).NE.NAMD) GO TO 91
         IF (JDEFL.EQ.0) GO TO 91
         CALL UNPACK(BUFFER(NPT+2),ICT,BUF,ICOL,LD)
         LAFT=LINES-KOUNT
         IF(LAFT.LT.3) KOUNT=LINES
         CALL TITLES(2)
         WRITE(ITAPEW,95) ICOUNT
         KOUNT=KOUNT+3
         C       LAST=O
150      100 CONTINUE
             NEXT=LAST+1
             LAST=LAST+R
             IF(LAST.GT.ICOL) LAST=ICOL
             CALL TITLES(2)
             WRITE(ITAPEW,96) (BUF(II),II=NEXT,LAST)
             KOUNT=KOUNT+1
             IF(LAST.LT.ICOL) GO TO 100
155      91 NPT=IBUFF(NPT+1)
                 FETCH POINTER TO PREVIOUS ROW
             GO TO 64
160      70 LROW=JROW-1
         C       REGISTER ROWS WHICH HAVE JUST BEEN PUT OUT
             IF (JROW.EQ.JROW) GO TO 75
             OTHERWISE WE JUST WROTE OUT SECOND PART, NOW TRY FIRST
165      170
170      171
172      173

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SUBROUTINE	REVERS	74/74	OPT=1	FTN 4.8+577	8/01/23 . 08 . 10 . 44	PAGE	5
VARIABLES	SN	TYPE	RELOCATION	REFS	52	I/O REFS	152
0 ITAPER	INTEGER	COMRWP	REFS	52	161		
1 ITAPEW	INTEGER	COMRWP	REFS	50			
2 JCORN	INTEGER	CLUE	REFS	50	147	DEFINED	103
12 JDEFL	INTEGER	CLUE	REFS	110	115	DEFINED	109
461 JINDEX	INTEGER	CLUE	REFS	109	110	DEFINED	114
461 JPT1	INTEGER	CLUE	REFS	125	96	DEFINED	125
443 JPT2	INTEGER	CLUE	REFS	142	168	DEFINED	140
464 JROW	INTEGER	CLUE	REFS	107	170	DEFINED	175
442 JROW1	INTEGER	CLUE	REFS	124	108	DEFINED	71
456 JROW2	INTEGER	CLIST	REFS	124	140	DEFINED	95
7 KBPAGE	INTEGER	CLIST	REFS	53			
4 KLABEL	INTEGER	CLUE	REFS	53			
3 KLU	INTEGER	CLUE	REFS	50			
5 KLUT1	INTEGER	CLUE	REFS	50			
0 KOUNT	INTEGER	CLIST	REFS	53	149	DEFINED	150
11 KOUNTH	INTEGER	CLIST	REFS	53			153
12 KOUNTI	INTEGER	CLIST	REFS	53			
1 KPAGE	INTEGER	CLIST	REFS	53			
463 KPT	INTEGER	CLIST	REFS	141		DEFINED	138
455 KPT1	INTEGER	CLIST	REFS	173		DEFINED	92
462 KPT2	INTEGER	CLIST	REFS	138		DEFINED	129
454 KROW1	INTEGER	CLIST	REFS	108	172	DEFINED	132
444 KROW2	INTEGER	CLIST	REFS	137	139	DEFINED	174
5 KTPAGE	INTEGER	CLIST	REFS	53		DEFINED	73
466 LAFT	INTEGER	CLIST	REFS	150		DEFINED	91
467 LAST	INTEGER	CLIST	REFS	157	158	DEFINED	131
465 LD	* INTEGER	CLIST	REFS	155	158	DEFINED	121
2 LINES	INTEGER	CLIST	REFS	148			128
10 LINESG	INTEGER	CLIST	REFS	53			
3 LINEST	INTEGER	CLIST	REFS	53			
445 LOCMP	INTEGER	CLIST	REFS	79	86	DEFINED	123
441 LROW	INTEGER	F.P.	REFS	93	117	DEFINED	117
1146 MATNAM	INTEGER	ARRAY	REFS	88	119	DEFINED	74
0 MAT1	INTEGER	F.P.	REFS	69	168	DEFINED	74
0 MAT2	INTEGER	F.P.	REFS	47	65	DEFINED	177
1 MAXAN	INTEGER	CLUE	REFS	64	65	DEFINED	131
6 MAXAN1	INTEGER	CLUE	REFS	180	184	DEFINED	146
11 MCROW	INTEGER	CLUE	REFS	66	67	DEFINED	180
407 NAMD	INTEGER	CLUE	REFS	50			180
0 NAME	INTEGER	CLUE	REFS	50			80
470 NEXT	INTEGER	ARRAY	F.P.	50			101
434 NMAT1	INTEGER	ARRAY	F.P.	50			111
437 NMAT2	INTEGER	ARRAY	F.P.	50			179
0 NO	INTEGER	CONSTS	REFS	146		DEFINED	41
10 NOBEAM	INTEGER	CLUE	REFS	48			63
7 NOWARP	INTEGER	CLUE	REFS	161		DEFINED	41
6 NPAGE	INTEGER	CLIST	REFS	65	180	DEFINED	157
447 NPT	INTEGER	CLIST	REFS	67			64
447 NPT	INTEGER	TAITTED	REFS	82	92	DEFINED	179
			REFS	148	112	DEFINED	132
			REFS	165	76	DEFINED	97
			REFS	165	83	DEFINED	113
			REFS	165	91	DEFINED	119

SUBROUTINE REVERS				74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE
VARIABLES	SN	TYPE	RELOCATION					
1 YES	1	INTEGER	CONSTS					
VARIABLES USED AS FILE NAMES,			SEE ABOVE					
EXTERNALS		TYPE	ARGS	REFERENCES	DEFINED	75	87	164
DCLOSE			1	184	43	55	139	174
GEDLAB			6	65				
GETROW			4	78	80	101	111	
MESSAGE			3	61	187			
PROGNA			2	60				
PUDLAB			6	67				
PUTROW			4	144				
TIMEB			2	62	186			
TITLES			1	151	160			
UNPACK			5	148				
STATEMENT LABELS		INACTIVE	DEF LINE	REFERENCES				
0	1		64	182				
30	20		71					
36	22		78	88				
66	28		89	79	127			
77	30		101	119				
106	32		103	100				
112	34		107	98	104	110		
121	40		111	104	2*110	120	123	
141	45		120	108				
144	48		124	102				
147	50		128	2*88				
152	52		131	2*119				
155	55		133	130				
162	62		141	176				
164	64		142	167				
0	66	INACTIVE	143	2*142				
251	70		168	142				
255	72		172	137				
262	75		177	170	172			
264	80		179	177				
245	91		164	146	147			
420	95	FMT	191	152				
423	96	FMT	192	161				
223	100		156	163				
272	1000		183	178				
COMMON BLOCKS	CLUE	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
COMRWP	3	11	0 IANAL (1)	1 MAXAN (1)				
CLIST	11		3 KLU (1)	4 INVER (1)				
			6 MAXAN (1)	7 NOWARP (1)				
			9 MCROW (1)	10 JDEFL (1)				
			0 ITAPER (1)	1 ITAPEW (1)				
			0 KOUNT (1)	1 KPAGE (1)				
			3 LINEST (1)	4 KLABEL (1)				
			6 NPAGE (1)	7 KBPAGE (1)				
			9 KOUNTH (1)	10 KOUNTI (1)				
CONSTS	2		0 NO (1)	1 YES (1)				

SUBROUTINE REVERS      74/74      OPT=1

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STATISTICS  
PROGRAM LENGTH      11778      639  
CM LABELED COMMON LENGTH      578      47  
52000B CM USED

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1      C45700, SUB. QBSOL (SOLVE THE EQUATION FOR THE NODAL DEFLECTIONS)
C      ****
C      **** SUBROUTINE QBSOL (MB ,MZ ,MX ,M1 ,M2) ****
C      **** OBJECTIVE ****
C      ****
C      **** SOLVES THE EQUATION L TRANSPOSE TIMES X = Z TO OBTAIN X WHICH IS *
C      **** THE MATRIX OF NODAL DEFLECTIONS. IN GENERAL QBSOL ONLY MANAGES *
C      **** THE SOLUTION; THE ACTUAL COMPUTATIONS ARE DONE IN QBAC. IF JDEFL *
C      **** IS NON ZERO, THE DEFLECTIONS ARE PRINTED OUT.
C      ****
C      **** INPUT/OUTPUT ****
C      **** THIS SUBROUTINE USES THE Z MATRIX ON MZ AND THE LOWER TRIANGLE *
C      **** MATRIX ON MB TO PRODUCE THE DEFLECTIONS ON MX.
C      ****
C      **** SUMMARY OF SYMBOLS ****
C      ****
C      **** ERROR MESSAGES ****
C      **** -----
C      **** *** ERROR *** ****
C      ****
C      ****
C      **** SUBROUTINE QBSOL (KORE,T,NAME1,MB,MZ,MX,M1,M2)
C      ****
C      INTEGER YES
C      ****
C      DIMENSION MATNAM(2)
C      DIMENSION NAME1(2)
C      DIMENSION IPOS(20)
C      DIMENSION T(KORE)
C      ****
C      COMMON /CLUE/ANAL,MAXAN,KLU,INVER,KLUT1,MAXAN1,
1     COMMON /NOVARP/,MCROW,JDEFL
1     COMMON /COMRWP/,ITAPER,ITAPEW,ITAPEP
1     COMMON /CLIST/,KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE
1     COMMON /CONSTS/,NO ,YES
COMMON /FILE/,IPOS
COMMON /CIDIV/,IDIV
C      ****
C      FUNCTION DEFINITION
1     TABSF(I) = IAABS(I)
1     MAXOF(I,J) = MAXO(I,J)
C      DATA INITIALIZATION
C      ****
C      CALL PROGNA (4H(QBS,4HOL))
CALL MESSAGE (1.33.33HQBSOL - MANAGES BACKWARD SOLUTION)
CALL TIMEB (1,1,1HFROM QBSOL )
DATA NAME /AHDEF/ /

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30 NIX = 0
  IF (NAME1(1).NE. NAME) GO TO 31
  IF (JDEF.L.EQ.0) GO TO 31
  KOUNT=LINES
  CALL TITLES(2)
  KOUNT=KOUNT+2
  WRITE(ITAPEW,6)
65   NFILMB = IPOS(MB)
  CALL GEDLAB (BHQBSSOL 01,MB,MATNAM,NFILMB,M,MC)
  NFILM2 = IPOS(MZ)
  CALL GEDLAB (BHQBSSOL 02,MZ,MATNAM,NFILM2,MR,N )
  IF (IABSF(M-192) - 8192) 40, 940, 940
40   40 IF (M - MC) 940,50,940
50   50 IF (M - MR) 940,60,940
60   60 IF (N) 940,940,70
70   70 LL = KORE - M/DIV
     LA = MAXOF(M,N) + 2
     LEFT = LL - LA
     IF (LEFT - LA) 920,920,100
100  10 = M1 + M2
    M1 = MZ
    MO = M1
    MU = M
    NFILMX = IPOS(MX)
    CALL PUDLAB (BHQBSSOL 01,MX,NAME1 ,NFILMX, M,N )
110  NFILMO = IPOS(MO)
    CALL PUDLAB (BHQBSSOL 02,MO,MATNAM,NFILMO, M,N )
    C      ACTUAL COMPUTATION OF THE BACKWARD SOLUTION
    CALL QBAC (T,T(LA),T(LA),T(LL),M,N,MU,LEFT,MB,MX,MI,MO)
120  120 IF (MU) 130,150,130
130  CONTINUE
    CALL TITLES(2)
    WRITE(ITAPEW,5)
    KOUNT=KOUNT+1
    MI = MO
    MO = IO - MI
    NFILMI = IPOS(MI)
    CALL GEDLAB (BHQBSSOL 03,MI,MATNAM,NFILMI,MC,NC)
95   95 GO TO 110
    150 GO TO 1000
    920 IND=54
100  CALL TITLES(2)
    KOUNT=KOUNT+1
    WRITE(ITAPEW,4) IND
    GO TO 1000
    940 IND=38
105  CALL TITLES(2)
    KOUNT=KOUNT+1
    WRITE(ITAPEW,4) IND
    1000 CONTINUE
    CALL DCLOSE (MB)
    CALL DCLOSE (MZ)
    CALL DCLOSE (MX)
    CALL DCLOSE (M1)
    CALL DCLOSE (M2)
    CALL TIMEB (10,10HFROM QBSOL )
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4	PAGE	85/01/23 . 08.10.44	FTN 4.8+577	FTN 4.8+577	74/74 OPT=1	SUBROUTINE QBSOL
VARIABLES	SN	TYPE	RELOCATION			
367	MI	INTEGER				
370	MO	INTEGER				
361	MR	INTEGER				
371	MU	INTEGER				
0	MX	INTEGER	F.P.	REFS	86	94
0	M2	INTEGER	F.P.	REFS	83	94
0	M1	INTEGER	F.P.	REFS	84	92
0	M2	INTEGER	F.P.	REFS	86	92
0	N	INTEGER	F.P.	REFS	87	95
362	NAME	INTEGER		DEFINED	80	78
305	NAME_1	INTEGER	ARRAY	REFS	81	86
0	NC	* INTEGER	F.P.	REFS	67	86
375	NFILMB	INTEGER		REFS	68	71
355	NFILMI	INTEGER		REFS	77	79
374	NFILMO	INTEGER		REFS	77	112
373	NFILMX	INTEGER		REFS	68	72
372	NFILMZ	INTEGER		REFS	59	57
360	NIX	* INTEGER		REFS	33	59
354	NO	INTEGER		REFS	95	95
0	NOBEAM	INTEGER		CONSTS	95	95
7	NOWARP	INTEGER		CLUE	95	94
6	NPAGE	INTEGER		CLUE	84	84
0	T	REAL	ARRAY	CLIST	82	82
1	YES	INTEGER		F.P.	74	82
	VARIABLES	USED AS FILE NAMES,	SEE ABOVE	CONSTS	57	84
EXTERNALS		TYPE	ARGS	REFERENCES	30	42
DCLOSF			1	108	109	111
GEDLAB			6	66	68	95
MESSAGE			3	55	114	
PROGNA			2	54		
PUDLAB			6	82	84	
QBAC			12	86		
TIMEB			2	56	113	
TITLES			1	62	89	99
INLINE FUNCTIONS		TYPE	ARGS	DEF LINE	REFERENCES	
IABS		INTEGER	1	INTRIN	69	
IABSF		INTEGER	1	SF	69	
MAXO		INTEGER	0	INTRIN	74	
MAXOF		INTEGER	2	SF	50	74
STATEMENT LABELS			DEF LINE	REFERENCES	101	106
324	4	FMT	118			
330	5	FMT	119			
336	6	FMT	120			
0	30	INACTIVE	58			
25	31		65			
0	40	INACTIVE	70			
0	50	INACTIVE	71			
0	60	INACTIVE	72			
0	70	INACTIVE	73			
0	100	INACTIVE	77			
73	110	INACTIVE	83			
0	120	INACTIVE	87			
0	130	INACTIVE	88			
126	150	INACTIVE	97			

SUBROUTINE QBSOL

85/01/23. 08.10.44

FTN 4.8+577

74/74 OPT=1

PAGE 5

## STATEMENT LABELS

127 920

136 940

144 1000

COMMON BLOCKS CLUE LENGTH 11

DEF LINE 98 2\*76

103 2\*69

107 97

2\*70 102

2\*71 102

2\*72

REFERENCES

MEMBERS - BIAS NAME(LENGTH)

O IANAL (1)

3 KLU (1)

6 MAXAN1 (1)

9 MCROW (1)

O ITAPER (1)

O KOUNT (1)

1 ITAPEW (1)

1 KPAGE (1)

3 LINEST (1)

6 NPAGE (1)

9 KOUNTH (1)

O NO (1)

O IPOS (20)

O IDIV (1)

1 MAXAN (1)

4 INVER (1)

7 NOWARP (1)

10 UDEFL (1)

1 ITAPEW (1)

2 ITAEP (1)

2 LINES (1)

5 KPAGE (1)

8 LINESG (1)

2 JCORN (1)

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10 UDEFL (1)

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1 YES (1)

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## STATISTICS

PROGRAM LENGTH

CM LABELED COMMON LENGTH

433B

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52000B CM USED

74/74 OPT=1

FTN 4.8+577 85/01/23. 08.10.44 PAGE 1

C45700. SUB. QBAC (COMPUTE THE BACKWARD SOL. OF EQ. FOR NODAL DEF'L'S)

C\*\*\*\*\*

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QBAC

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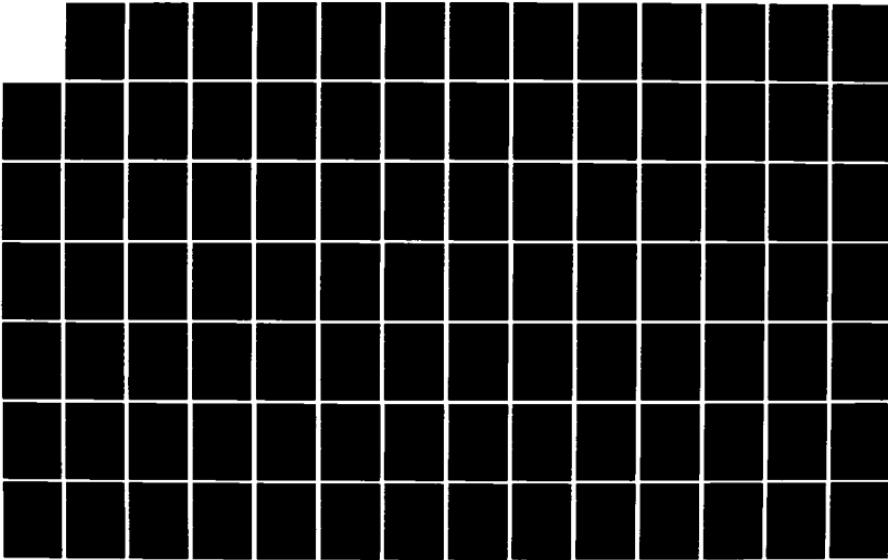
        L(I) = 1 - LEAD
        LLB = LB + 1 - L(I)
        J = LEAD
        DO 140   JI = LLB,LB
        J = J + 1
140   B(JI) = T(J)
        150   CALL GETROW (MI,1,T,N)
        K = MU
        INC = L(MU)
        KK = KORE - L(MU)
        KI = KORE - MUI
        MUI = MUI + 1
C       ENTRY POINT IN HOTDOT
        CALL HOTDOT (N,O,T,X,S,1,N,2)
        160   IF (K - LOW) 210,170,170
        170   IF (KI - KK) 180,180,190
        180   S = O.
        GO TO 200
        190   S = -B(KI)
        200   CALL HOTDOT (N,O,T,X,S,1,N,3)
        KI = KI - INC + 1
        K = K - 1
        INC = L(K)
        KK = KK - INC
        GO TO 160
        210   IF (KEY) 240,220,240
        220   R = B(LB)
        LOW = I
        DO 230   J = 1,N
        T(J) = T(J) / R
230   X(J,MUI) = T(J)
        240   CALL PUTROW (IT,1,T,N)
        LB = LLB - 1
        GO TO 90
        250   MU = LOW - 1
        RETURN
        END

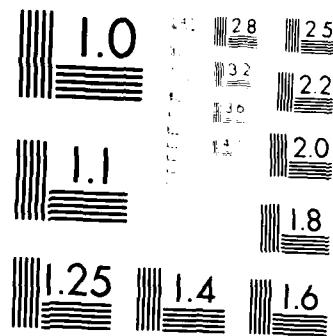
```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFLINES
	3 QBAC	29	93
VARIABLES	SN TYPE	ARRAY F.P.	RELOCATION
0 B	REAL		REFS 36 76 84 DEFINED 29 63
272 DUMMY	* REAL		REFS 54
270 I	INTEGER		REFS 46 48 57 2*58 59 85
301 INC	INTEGER		DEFINED 45
261 IT	INTEGER		REFS 78 81 DEFINED 66 80
276 J	INTEGER		REFS 89 38 52
277 JI	INTEGER		REFS 62 63 2*87 2*88 DEFINED 60 62

AD-A152 278    ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER    4/8  
PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1  
UNCLASSIFIED    N00019-81-C-0395    F/G 9/2    NL





MICROCOPY RESOLUTION TEST CHART

NA = Numerical Aperture; MM = Magnification

SUBROUTINE QBAC			74/74	OPT=1		FTN 4.8+577	85/01/23.	08.10.44	PAGE	3
<b>VARIABLES</b>										
300 K		INTEGER			RELOCATION	REFS	72	79	DEFINED	65
264 KEY		INTEGER				REFS	47	83	DEFINED	41
303 KI		INTEGER				REFS	73	76	DEFINED	68
302 KK		INTEGER				REFS	73	81	DEFINED	67
0 KORE		INTEGER				REFS	44	67	DEFINED	81
273 KOUNT		INTEGER				REFS	54	55	DEFINED	29
0 L		INTEGER				REFS	36	59	DEFINED	67
267 LB		INTEGER				REFS	29	58	DEFINED	67
275 LEAD		INTEGER				REFS	48	59	DEFINED	80
271 LLB		INTEGER				REFS	57	58	DEFINED	60
274 LOC		INTEGER				REFS	50	61	DEFINED	48
262 LOW		INTEGER				REFS	56	57	DEFINED	55
266 LX		INTEGER				REFS	72	92	DEFINED	39
0 M		INTEGER				REFS	49	50	DEFINED	43
0 MB		INTEGER				REFS	40	56	DEFINED	29
0 MI		INTEGER				REFS	54	64	DEFINED	29
0 MO		INTEGER				REFS	52	52	DEFINED	29
263 MP2		INTEGER				REFS	55	40	DEFINED	49
0 MU		INTEGER				REFS	39	45	DEFINED	66
265 MUI		INTEGER				REFS	29	92	DEFINED	67
0 MX		INTEGER				REFS	45	68	DEFINED	42
0 N		INTEGER				REFS	38	69	DEFINED	69
305 R		REAL				REFS	36	49	DEFINED	29
304 S		REAL				REFS	87	88	DEFINED	29
0 T		REAL				REFS	71	77	DEFINED	71
0 X		REAL				REFS	36	71	DEFINED	77
<b>EXTERNALS</b>										
		TYPE	ARGS		REFERENCES		54	56	DEFINED	64
							71	77		
							89			
							57			
<b>STATEMENT LABELS</b>										
20 90					DEF LINE	REFERENCES	45	91		
0 100							47	2*46		
0 110							48	47		
0 120							51	2*50		
34 130							54	50		
0 140							63	61		
72 150							64	2*47		
117 160							72	82		
0 170							73	2*72		
0 180							74	2*73		
125 190							76	73		
130 200							77	75		
145 210							83	72		
0 220							84	83		
0 230							88	86		
165 240							89	2*83		
174 250							92	46		

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FTN 4.8+577

SUBROUTINE QBAC

74/74 OPT=1

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
66	140	J1	61 63	2B	INSTACK
161	230	J	86 88	3B	INSTACK

STATISTICS

PROGRAM LENGTH

52000B CM USED

306B 198



SUBROUTINE UNFIL 74/74 OPT=1

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```
C          10 CONTINUE
C          IF(NPASS.EQ.1) GO TO 500
C
IUGO1=1
IUGO2=2
IUGO3=3
IUGO4=4
IUN1   = 8 - 101NC
IUOUT1 = 9 - 101NC
IUOUT2 = 10 - 101NC
IUN2   = 11 - 101NC
IFS1=1
IFS2=1
IFS3=1
IFS4=1
C
IUA=IUIN1
IUA2 = IUA
IUY=IUIN1
IUMEMN=IUIN1
IUSTFN=IUIN1
IUMEMF=IUOUT1
CIBM
C          CALL DINIT(13,BHFT13FO01)
CIBM
IUSCR = 13
IUKS=IUIN1
IUSLTI=IUIN1
IUDLTI=IUIN1
C
IF(IRED.EQ.0) GO TO 20
C
IFSTFN=1
IFMEMN=2
IFY=3
IFA=4
NEXT=5
IF(KFREE.EQ.1) GO TO 15
IFSLTI=NEXT
NEXT=NEXT+1
IFDLTI=NEXT
NEXT=NEXT+1
15 IFSCR = 1
IUIN1 = 13
C
GO TO 30
C
20 CONTINUE
IFSTFN=1
IFMEMN=2
IFKS=3
NEXT=4
IF(KFREE.EQ.1) GO TO 25
IFSLTI=NEXT
IFOLTI=IFSLTI
NEXT=NEXT+1
59
UNFIL 60
UNFIL 61
UNFIL 62
UNFIL 63
UNFIL 64
UNFIL 65
UNFIL 66
UNFIL 67
UNFIL 68
UNFIL 69
UNFIL 70
UNFIL 71
UNFIL 72
UNFIL 73
UNFIL 74
UNFIL 75
UNFIL 76
UNFIL 77
UNFIL 78
UNFIL 79
UNFIL 80
UNFIL 81
UNFIL 82
UNFIL 83
UNFIL 84
UNFIL 85
UNFIL 86
UNFIL 87
UNFIL 88
UNFIL 89
UNFIL 90
UNFIL 91
UNFIL 92
UNFIL 93
UNFIL 94
UNFIL 95
UNFIL 96
UNFIL 97
UNFIL 98
UNFIL 99
UNFIL 100
UNFIL 101
UNFIL 102
UNFIL 103
UNFIL 104
UNFIL 105
UNFIL 106
UNFIL 107
UNFIL 108
UNFIL 109
UNFIL 110
UNFIL 111
UNFIL 112
UNFIL 113
UNFIL 114
UNFIL 115
```



SUBROUTINE UNFIL 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 4  
 IF(IRED.EQ.0) GO TO 120  
 IFDLT=NEXT  
 NEXT=NEXT+1  
 C 120 IF(KLUBAL.EQ.0) GO TO 140  
 IUBAL=IUOUT2  
 IFBAL=NEXT  
 NEXT=NEXT+1  
 C 140 IUDSF=IUOUT2  
 IFDSF=NEXT  
 NEXT=NEXT+1  
 TUWT=IUOUT2  
 IFWT=NEXT  
 NEXT=NEXT+1  
 C 400 CONTINUE  
 C GO TO 1000  
 C 500 CONTINUE  
 C IUG01=1  
 IUG02=2  
 IUG03=3  
 IUG04=4  
 IUIN1=8 -IOINC  
 IUOUT1=9 -IOINC  
 IUOUT2=10 -IOINC  
 IUIN2=11 -IOINC  
 IFS1=1  
 IFS2=1  
 IFS3=1  
 IFS4=1  
 C IUA=IUIN1  
 IUY=IUIN1  
 IUMEMN=IUIN1  
 IUSCR=IUIN1  
 IUKS=IUIN1  
 C IUSTFN=IUIN2  
 IFSTFN=1  
 NEXT=2  
 IF(KLUMD.EQ.0) GO TO 505  
 IUMDBI=IUIN2  
 IFMDBI=2  
 NEXT=3  
 GO TO 507  
 C 505 IF(MSADD.EQ.0) GO TO 507  
 IUADDI=IUIN2  
 IFADDI=2  
 NEXT=3  
 C 507 IF(KFREE.EQ.1) GO TO 510

UNFIL 173  
 UNFIL 174  
 UNFIL 175  
 UNFIL 176  
 UNFIL 177  
 UNFIL 178  
 UNFIL 179  
 UNFIL 180  
 UNFIL 181  
 UNFIL 182  
 UNFIL 183  
 UNFIL 184  
 UNFIL 185  
 UNFIL 186  
 UNFIL 187  
 UNFIL 188  
 UNFIL 189  
 UNFIL 190  
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 UNFIL 209  
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 UNFIL 211  
 UNFIL 212  
 UNFIL 213  
 UNFIL 214  
 UNFIL 215  
 UNFIL 216  
 UNFIL 217  
 UNFIL 218  
 UNFIL 219  
 UNFIL 220  
 UNFIL 221  
 UNFIL 222  
 UNFIL 223  
 UNFIL 224  
 UNFIL 225  
 UNFIL 226  
 UNFIL 227  
 UNFIL 228  
 UNFIL 229

```

IUMPLI=IUIN2          230
IFMPLI=NEXT           231
NEXT=NEXT+1            232
IUSLTI=IUIN2          233
IFSLSLTI=NEXT          234
NEXT=NEXT+1            235
IUDLTI=IUIN2          236
IFDLTI=IFSLTI          237
IF(IRED.EQ.0) GO TO 510 238
IFDLTI=NEXT           239
NEXT=NEXT+1            240
UNFIL 241
UNFIL 242
UNFIL 243
UNFIL 244
UNFIL 245
UNFIL 246
UNFIL 247
UNFIL 248
UNFIL 249
UNFIL 250
UNFIL 251
UNFIL 252
UNFIL 253
UNFIL 254
UNFIL 255
UNFIL 256
UNFIL 257
UNFIL 258
UNFIL 259
UNFIL 260
UNFIL 261
UNFIL 262
UNFIL 263
UNFIL 264
UNFIL 265
UNFIL 266
UNFIL 267
UNFIL 268
UNFIL 269
UNFIL 270
UNFIL 271
UNFIL 272
UNFIL 273
UNFIL 274
UNFIL 275
UNFIL 276
UNFIL 277
UNFIL 278
UNFIL 279
UNFIL 280
UNFIL 281
UNFIL 282
UNFIL 283
UNFIL 284
UNFIL 285
UNFIL 286

IUMPLI=IUIN2          230
IFMPLI=NEXT           231
NEXT=NEXT+1            232
IUSLTI=IUIN2          233
IFSLSLTI=NEXT          234
NEXT=NEXT+1            235
IUDLTI=IUIN2          236
IFDLTI=IFSLTI          237
IF(IRED.EQ.0) GO TO 510 238
IFDLTI=NEXT           239
NEXT=NEXT+1            240
C 510 IF(KLUBAL.EQ.0) GO TO 515 241
IFBALI=IUIN2          242
IFBALI=NEXT           243
NEXT=NEXT+1            244
C 515 IUDESI=IUIN2          245
IFDESI=NEXT           246
NEXT=NEXT+1            247
IUWTI=IUIN2          248
IFWTI=NEXT           249
NEXT=NEXT+1            250
C 520 CONTINUE          251
IFMEMN=2              252
IFY=3                 253
IFA=4                 254
IFSCR=5               255
GO TO 530             256
C 520 CONTINUE          257
IFMEMN=2              258
IFKS=3                259
IFSCR=4               260
GO TO 530             261
C 530 CONTINUE          262
C 530 CONTINUE          263
C 550 CONTINUE          264
IUSTFO=IOUT2           265
IFSTFO*x* 1            266
NEXT=2                 267
IUDUM3=IUSTFN+IUSTFO 268
IFDUM3=IFSTFN+IFSTFO 269
IUMEMF=IOUT1           270
IFMEMF=1                271
IUDESN=IUGO2           272
IFDESN=1                273
IFS2=2                 274
IUDESO=IL..N1           275
IFDESO=IFSCR            276
IUDUM2=IUDESN+IUDESO 277
IFDUM2=IFDESN+IFDESO 278
IF(KLUMD.EQ.0) GO TO 600 279

```

SUBROUTINE UNFIL      74 / 74      OPT = 1

```

IUMDB=1UOUT2
IFM0B=2
NEXT=3
GO TO 615

C   600 IF(MSADD.EQ.0) GO TO 615
IUADD=1UOUT2
IFADD=2
NEXT=3

C   615 IF(KFREE.EQ.1) GO TO 620
IUMPL=1UOUT2
IFMPL=NEXT
NEXT=NEXT+1
IUSSLT=1UOUT2
IFSLLT=NEXT
NEXT=NEXT+1
IUDLT=1UOUT2
IFDLT=IFSLLT
IF(LRD.EQ.0) GO TO 620
IFDLT=NEXT
NEXT=NEXT+1

C   620 IF(KLUBAL.EQ.0) GO TO 640
IUBAL=1UOUT2
IFBAL=NEXT
NEXT=NEXT+1
640 IUDESF=1UOUT2
IFDESF=NEXT
NEXT=NEXT+1
IUWT=1UOUT2
IFWT=NEXT
NEXT=NEXT+1

C   1000 CONTINUE
IUL=1UG02
IFL=IF52
IUYT=1UG01
IFYT=IFS1
IUZ=IUN1
IFZ=IFSCR
IUZR=1UG01
IFZR=IFS1
IULR=IUN1
IFLR=IFSCR
IUBR=1UG02
IFBR=IF52
IUB=IUN1
IFB=IFSCR
IUBT=1UG01
IFBT=IFS1

C   1000 CONTINUE
IUMD=1UG02
IFMD=IF52
IF(KFREE.EQ.1) GO TO 9999
IFPGT=1UG02
IFPT=IFMD

```

```

400 IFQAT=2
      IUPHA=IUGO4
      IFFHA=2
      IUPHAT=IUGO3
      IFFHAT=2
      IFS3=3
      IFS4=3
      GO TO 9999
C   1150 CONTINUE
      IFSCR=IFB+1
      GO TO 9999
C   1200 CONTINUE
      IFS1=IFS1+1
      GO TO 9999
C   1300 CONTINUE
      IFS1 = IFMODM
      C
      C   9999 CONTINUE
      C   CALL MESSAGE(2,5,5HU)
      C
      END
410
415
420
425

```

## SYMBOLIC DIFFERENCE MAP ( $B=3$ )

ENTRY POINTS	DEF LINE	VARIABLES	SN	TYPE	RELOCATION	ARRAY	INVERT	REFS
3	UNFL	AORD	3	REAL				REFS
		D	15	REAL				REFS
		DBAL	27	REAL				REFS
		DEL	16	REAL				REFS
		DWMAX	12	REAL				REFS
		EPS1	11	REAL				REFS
		EPS2	17	REAL				REFS
		IBAND	22	INTEGER				REFS
		IDNOPT	7	INTEGER				REFS
		IFA	21	INTEGER				REFS
		IFADD	67	INTEGER				REFS
		IFADDI	41	INTEGER				REFS
		IFB	33	INTEGER				REFS
		IFBAL	71	INTEGER				REFS
		IFBALI	43	INTEGER				REFS
		IFBR	117	INTEGER				REFS
		IFBT	53	INTEGER				REFS
		IFDEF	73	INTEGER				REFS
		IFDEST	45	INTEGER				REFS

SUBROUTINE UNFIL 74/74 OPT=1

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SUBROUTINE UNFIL

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VARIABLES	SN	TYPE	RELOCATION					
55 IFDESN		INTEGER	PLACES	REFS	8	151	284	DEFINED 146
35 IFDESO		INTEGER	PLACES	REFS	8	151	284	DEFINED 149
21 IFDLT		INTEGER	PLAYFF	REFS	29	171	284	DEFINED 173
3 IFDLTI		INTEGER	PLAYFF	REFS	29	171	284	DEFINED 173
77 IFDUM1		INTEGER	PLACES	REFS	8	29	284	DEFINED 151
101 IFDUM2		INTEGER	PLACES	REFS	8	29	284	DEFINED 151
103 IFDUM3		INTEGER	PLACES	REFS	8	29	284	DEFINED 151
23 IFIN		INTEGER	KLUES	REFS	4	129	137	DEFINED 129
141 IFINCK		INTEGER	PLACES	REFS	8	35	380	DEFINED 380
137 IFINCM		INTEGER	PLACES	REFS	8	35	380	DEFINED 380
31 IFKS		INTEGER	PLACES	REFS	8	35	380	DEFINED 380
105 IFLX		INTEGER	PLACES	REFS	8	35	380	DEFINED 380
2 IFLEX		INTEGER	INVERT	REFS	35	35	380	DEFINED 380
115 IFLR		INTEGER	PLACES	REFS	8	342	339	DEFINED 339
57 IFMD		INTEGER	PLACES	REFS	8	342	339	DEFINED 339
65 IFMDB		INTEGER	PLACES	REFS	8	342	339	DEFINED 339
37 IFMDBI		INTEGER	PLACES	REFS	8	342	339	DEFINED 339
1 IFMDF		INTEGER	PLAYFF	REFS	29	344	277	DEFINED 277
61 IFMDF		INTEGER	PLACES	REFS	8	29	344	DEFINED 277
25 IFMEM		INTEGER	PLACES	REFS	8	142	277	DEFINED 277
51 IFMEMO		INTEGER	PLACES	REFS	8	142	277	DEFINED 277
5 IFMOD		INTEGER	LOCSTR	REFS	33	344	277	DEFINED 277
125 IFMODK		INTEGER	PLACES	REFS	8	376	375	DEFINED 375
123 IFMODM		INTEGER	PLACES	REFS	8	376	375	DEFINED 375
15 IFMPL		INTEGER	PLAYFF	REFS	29	366	364	DEFINED 364
7 IFMPLI		INTEGER	PLAYFF	REFS	29	366	364	DEFINED 364
3 IFMREF		INTEGER	LOCSTR	REFS	33	45	373	DEFINED 373
13 IFPATF		INTEGER	PLACES	REFS	8	29	45	DEFINED 43
135 IFPH		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
27 IFPHA		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
31 IFPHAT		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
127 IFPHT		INTEGER	PLACES	REFS	8	29	45	DEFINED 43
121 IFPHTF		INTEGER	PLACES	REFS	8	29	45	DEFINED 43
133 IFQ		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
23 IFQA		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
25 IFQAT		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
131 IFQT		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
11 IFSCR		INTEGER	PLAYFF	REFS	29	29	45	DEFINED 43
17 IFSLT		INTEGER	PLAYFF	REFS	29	115	265	DEFINED 265
5 IFSLTI		INTEGER	PLAYFF	REFS	29	115	265	DEFINED 265
27 IFSTFN		INTEGER	PLAYFF	REFS	29	115	265	DEFINED 265
63 IFSTFO		INTEGER	PLACES	REFS	8	129	137	DEFINED 137
13 IFS2		INTEGER	PLACES	REFS	33	101	275	DEFINED 275
14 IFS3		INTEGER	PLACES	REFS	8	29	275	DEFINED 275
15 IFS4		INTEGER	PLACES	REFS	8	29	275	DEFINED 275
11 IFTP GT		INTEGER	PLAYFF	REFS	29	115	275	DEFINED 275
75 IFWT		INTEGER	PLAYFF	REFS	29	115	275	DEFINED 275
47 IFWTI		INTEGER	PLAYFF	REFS	29	115	275	DEFINED 275
21 IFY		INTEGER	PLAYFF	REFS	29	115	275	DEFINED 275

SUBROUTINE	UNFTL	74/74	OPT=1
VARIABLES	SN	TYPE	RELOCATION
107	IYFT	INTEGER	PLACES
111	IFZ	INTEGER	PLACES
113	IFZR	INTEGER	PLACES
0	INVERT	INTEGER	INVERT
0	IOINC	INTEGER	CSETUP
41	IPERM	INTEGER	ARRAY
173	IPREV	INTEGER	INVERT
2	IRED	INTEGER	KLUES
20	IUA	INTEGER	PLACES
66	IUADD	INTEGER	PLACES
40	IUADD1	INTEGER	PLACES
1	IUA2	INTEGER	INVERT
32	IUB	INTEGER	PLACES
70	IUBAL	INTEGER	PLACES
42	IUBAL1	INTEGER	PLACES
116	IUBR	INTEGER	PLACES
52	IUBT	INTEGER	PLACES
16	IUCD	INTEGER	PLACES
72	IUDESF	INTEGER	PLACES
44	IUDESI	INTEGER	PLACES
54	IUDESN	INTEGER	PLACES
34	IUDESO	INTEGER	PLACES
20	IUDLT	INTEGER	PLAYFF
2	IUDLT1	INTEGER	PLAYFF
76	IUDUM1	INTEGER	PLACES
100	IUDUM2	INTEGER	PLACES
102	IUDUM3	INTEGER	PLACES
4	IUG01	INTEGER	REFS
5	IUG02	INTEGER	PLACES
6	IUG03	INTEGER	PLACES
7	IUG04	INTEGER	PLACES
140	IUINCK	INTEGER	PLACES
136	IUINCM	INTEGER	PLACES
0	IUIN1	INTEGER	PLACES
1	IUIN2	INTEGER	PLACES
30	IUKS	INTEGER	PLACES
104	IUL	INTEGER	PLACES
114	IULR	INTEGER	PLACES
56	IUMD	INTEGER	PLACES
64	IUMDB	INTEGER	PLACES
36	IUMDB1	INTEGER	PLAYFF
0	IUMDF	INTEGER	PLACES
60	IUMEMF	INTEGER	PLACES
24	IUMEMN	INTEGER	PLACES
50	IUMEMO	INTEGER	LOCSTR
4	IUMOD	INTEGER	PLACES
124	IUMODK	INTEGER	PLACES
122	IUMODM	INTEGER	REFS

		FIN 4 8+577	85/01/23	08.10.44	PAGE
REFS	8	DEFINED	324		
REFS	8	DEFINED	326		
REFS	8	DEFINED	328		
REFS	35	DEFINED	292		
REFS	27	42	66	68	69
REFS	200	201	202		199
REFS	35				
REFS	4	89	172	237	253
REFS	8	76	159	75	208
REFS	8	DEFINED	224		
REFS	35	DEFINED	76		
REFS	8	DEFINED	333		
REFS	8	DEFINED	177		
REFS	8	DEFINED	242		
REFS	8	DEFINED	331		
REFS	8	DEFINED	335		
REFS	8	DEFINED	181	313	
REFS	8	DEFINED	246		
REFS	8	DEFINED	145	278	
REFS	8	150	283	148	281
REFS	29	DEFINED	170	303	
REFS	29	DEFINED	87	235	
REFS	8	DEFINED	141		
REFS	8	DEFINED	150	283	
REFS	8	DEFINED	128	274	
REFS	8	125	138	323	
REFS	8	125	374	377	
REFS	365	372	145	278	
REFS	8	145	321	331	
REFS	63	196	321	338	
REFS	8	385	390	397	
REFS	64	197	359	361	
REFS	8	359	379	382	
REFS	64	377	75	78	
REFS	8	75	208	209	
REFS	8	329	333	388	
REFS	8	214	218	224	
REFS	242	246	249	249	
REFS	8	DEFINED	65	69	
REFS	8	DEFINED	85	212	
REFS	8	DEFINED	321		
REFS	8	DEFINED	329		
REFS	8	DEFINED	338		
REFS	8	DEFINED	153	286	
REFS	8	DEFINED	218		
REFS	29	DEFINED	343		
REFS	8	DEFINED	80	143	
REFS	8	141	DEFINED	78	
REFS	8	141	DEFINED	138	
REFS	33	DEFINED	44		
REFS	8	DEFINED	365	374	
REFS	8	DEFINED	363	372	

PROGRAM	LENGTH	52000R CM USED	STATISTICS	155B
OPT = 1	109			
RELOCATION	85/01/23.	08.10.44	PAGE	3
RELOCATION	FTN 4.8+577			
VARIABLES	SN TYPE			
124 INDEX	INTEGER			
137 INDEXx2	INTEGER			
127 INO	INTEGER			
126 INX	INTEGER			
132 IST	INTEGER			
133 IX	INTEGER			
141 JEND	INTEGER			
136 JNX	INTEGER			
0 JROW	INTEGER	F.P.	DEFINED	82
140 JUST	INTEGER	REFS	DEFINED	86
135 J2CT	INTEGER	REFS	DEFINED	93
130 K	INTEGER	REFS	DEFINED	97
0 KROW	INTEGER	REFS	DEFINED	98
125 LOCSUM	INTEGER	REFS	DEFINED	99
131 NACT	INTEGER	F.P.	DEFINED	100
123 NROW	INTEGER	REFS	DEFINED	101
STATEMENT LABELS	DEF LINE	REFERENCES	PROPERTIES	
14 15	48	54	NOT INNER	
0 20	50	62	INSTACK	
23 25	55	69		
0 30	60	52		
40 35	65	56		
45 36	67	50		
51 40	70	66		
0 46	76	96		
64 50	79	2*74		
0 52	82	2*84		
73 54	85	2*81		
0 58	89	81		
113 60	92	87		
0 65	95	74		
LOOPS LABEL INDEX	FROM-TO LENGTH			
27 30 K	56 60 7B			
56 65 IX	72 95 44B			
103 58 K	87 89 3B			

```

NROW=NROW+1
IF (NROW .GT. KROW) RETURN
30 CONTINUE
INX=INX+1
GO TO 15

C**35 NA=IBUFF(INX)
C      NACT = NUMBER OF NON-ZERO ELEMENTS IN THIS STRING
35 NACT=IBUFF(INX)
IF (LOCSUM+NACT-NROW) 36,40,40
36 INX=INX+NACT+1
LOCsum=LOCsum+NACT
GO TO 15

40 ISt=INX+NROW-LOCsum
INO=INX+NACT
DO 65 IX=ISt,INO
A=BUFFER(IX)
IF (A) 46,60,46
C      MULTIPLY THIS ELEMENT BY A ROW OF MATRIX B TO GET PARTIALS
46 J2CT = 1
JNX=INDEX+1
INDEX2=IBUFF(INDEX)-1
CONTINUE
50 C      BEGIN LOOP ON A ROW OF B, END AT 60
      IF (IBUFF(JNX)) 52,52,54
52 J2CT=J2CT-1BUFF(JNX)
JNX=JNX+1
IF (JNX-INDEX2) 50,50,60
54 JUST=JNX+1
JEND=JNX+IBUFF(JNX)
DO 58 K=JUST,JEND
DBUFF(J2CT)=DBUFF(J2CT)+A*BUFFER(K)
58 J2CT=J2CT+1
IF (JNX-INDEX2) 50,50,60
60 NROW=NROW+1
INDEX=IBUFF(INDEX)
IF (NROW.GT.KROW) RETURN
65 CONTINUE
GO TO 36
END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	RELOCATION	REFS	DEFINED	73
VARIABLES	SN	TYPE			88	DEFINED
134 A		REAL	ARRAY F P.	REFS 36	73	29
0 BUFFER		REAL	ARRAY F P.	REFS 37	88	DEFINED 29
0 DBUFF		REAL	ARRAY F P.	REFS 47	29	88
0 IAST		INTEGER	F P.	REFS 45	29	DEFINED 29
0 IBST		INTEGER	F P.	REFS 38	50	57
0 IBUFF		INTEGER	ARRAY F P.	REFS 51	65	78



SUBROUTINE MULT 74/74 OPT=1

DEF LINE REFERENCES

STATEMENT LABELS	244 100	177	175
	240 101	176	173
	123 200	131	126
	260 205	184	191
	302 210	192	178
	570 250 FMT	212	181
	305 777	195	82
	576 778 FMT	214	197
	314 1000	199	194

LOOPS	LABEL	INDEX	FROM-T0	LENGTH	PROPERTIES
	132 17	J2CT	137	138	2B INSTACK
	226 74	M	171	172	2B INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	
COMRWP	3	O ITAPER (1)	1 ITAPEP (1)
CLIST	11	O KOUNT (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)
		6 NPAGE (1)	5 KTPAGE (1)
		9 KOUNTH (1)	8 LINESG (1)
CONSTS	2	O NO (1)	10 KOUNTI (1)
FILE	20	O YES (1)	1 YES (1)
		O IPOS (20)	

STATISTICS	PROGRAM LENGTH	716B	462
	CM LABELED COMMON LENGTH	44B	36
	5200OB CM USED		

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SUBROUTINE MULT 74/74 OPT=1

VARIABLES SN TYPE RELOCATION

0	MATNAM	INTEGER	ARRAY	F.P.
0	MAT 1	INTEGER		F.P.
0	MAT 2	INTEGER		F.P.
645	MIN	INTEGER		DEFINED
631	MOUT	INTEGER		DEFINED
0	MTEMP 1	INTEGER		DEFINED
0	MTEMP 2	INTEGER		DEFINED
657	NAME	INTEGER	ARRAY	REFS
661	NAME 1	INTEGER	ARRAY	REFS
654	NEXT	INTEGER		REFS
643	NFANS	INTEGER		REFS
613	NFMAT 1	INTEGER		REFS
616	NFMAT 2	INTEGER		REFS
650	NFMIN	INTEGER		REFS
642	NFMOUT	INTEGER		REFS
0	NO	INTEGER	CONSTS	REFS
6	NPAGE	INTEGER	CLIST	REFS
627	NROW	INTEGER	CONSTS	REFS
1	YES	INTEGER	CONSTS	REFS

VARIABLES USED AS FILE NAMES. SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES
DCLOSE		1	151
ENMMPY		7	145
GEDLAB		6	78
GETROW		4	100
MESSAGE		3	74
PROGNA		2	73
PUDLAB		6	121
PUTROW		4	149
TIMEB		2	75
TITLES		1	128

STATEMENT LABELS INACTIVE DEF LINE REFERENCES

0	1	INACTIVE	84	122	150	193
123	2	INACTIVE	133	119		
0	4	INACTIVE	120	2*119		
103	6		123	155		
562	7	FMT	211	109	102	168
45	10		100	109	2*102	2*109
54	12		103	137	95	134
71	15		110	138	137	148
126	16		140	134	134	148
0	17		143	139	139	159
135	18		144	149	97	148
140	20	INACTIVE	144	149	123	123
0	25		144	149	172	171
155	71		144	149	213	189
221	73		144	149	210	129
0	74	FMT	144	149	216	
573	80	FMT	144	149		
553	81	INACTIVE	144	149		
0	99		144	149		

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SUBROUTINE	MULT	74/74	OPT=1	
VARIABLES	SN	TYPE	RELOCATION	
O BUFFER	REAL	ARRAY	F.P.	
O DBUFF	* REAL	ARRAY	F.P.	
636 DUMMY	*	INTEGER		
641 I	INTEGER			
623 IAST	INTEGER			
625 IBST	INTEGER			
O IBUFF	INTEGER	ARRAY	F.P.	
637 ICOUNT	INTEGER			
646 ICT	INTEGER			
656 IND	INTEGER			
634 INDEX	INTEGER			
651 INO	*	INTEGER		
630 IO	INTEGER			
O IPPOS	INTEGER	ARRAY	FILE	
O IPRINT	INTEGER			
632 IREAD	INTEGER			
614 IR1	INTEGER			
617 IR2	INTEGER			
621 ISIZE	INTEGER			
624 ISTART	INTEGER			
2 ITAPEP	INTEGER			
O ITAPER	INTEGER			
1 ITAPEW	INTEGER			
633 IWRITE	INTEGER			
655 J	INTEGER			
615 JC1	INTEGER			
620 JC2	INTEGER			
622 JC2X2	INTEGER			
626 JROW	INTEGER			
644 J2CT	INTEGER			
7 KBPAGE	INTEGER			
4 KLABEL	INTEGER			
O KOUNT	INTEGER			
11 KOUNTH	INTEGER			
12 KOUNTI	INTEGER			
1 KPAGE	INTEGER			
640 KROW	INTEGER			
5 KTPAGE	INTEGER			
647 LAFT	INTEGER			
653 LAST	INTEGER			
2 LINES	INTEGER			
10 LINESG	INTEGER			
3 LINEST	INTEGER			
635 LOCEMP	INTEGER			
O LSIZE	INTEGER			
652 M	INTEGER			
O MATANS	INTEGER			
525 MATN	INTEGER			

SUBROUTINE	MULT	74/74	OPT=1		FTN 4.8+577	85/01/23. 08.10.44	PAGE	5
VARIABLES	SN	TYPE	RELOCATION					
O BUFFER	REAL	ARRAY	F.P.					
O DBUFF	* REAL	ARRAY	F.P.					
636 DUMMY	*	INTEGER			REFS	104	144	149
641 I	INTEGER				REFS	145	145	174
623 IAST	INTEGER				REFS	176	189	
625 IBST	INTEGER				REFS	61	172	
O IBUFF	INTEGER	ARRAY	F.P.		REFS	100	100	
637 ICOUNT	INTEGER				REFS	133	150	
646 ICT	INTEGER				REFS	87	145	
656 IND	INTEGER				REFS	145	181	
634 INDEX	INTEGER				REFS	62	89	
651 INO	*	INTEGER			REFS	100	107	
630 IO	INTEGER				REFS	102	104	
O IPPOS	INTEGER	ARRAY	FILE		REFS	144	104	
O IPRINT	INTEGER				REFS	144	107	
632 IREAD	INTEGER				REFS	104	2*106	
614 IR1	INTEGER				REFS	161	107	
617 IR2	INTEGER				REFS	158	195	
621 ISIZE	INTEGER				REFS	62	70	
624 ISTART	INTEGER				REFS	162	77	
2 ITAPEP	INTEGER				REFS	126	178	
O ITAPER	INTEGER				REFS	134	178	
1 ITAPEW	INTEGER				REFS	78	95	
633 IWRITE	INTEGER				REFS	80	121	
655 J	INTEGER				REFS	90	125	
615 JC1	INTEGER				REFS	99	109	
620 JC2	INTEGER				REFS	99	109	
622 JC2X2	INTEGER				REFS	89	99	
626 JROW	INTEGER				REFS	89	99	
644 J2CT	INTEGER				REFS	87	119	
7 KBPAGE	INTEGER				REFS	80	119	
4 KLABEL	INTEGER				REFS	80	121	
O KOUNT	INTEGER				REFS	174	176	
11 KOUNTH	INTEGER				REFS	86	2*187	
12 KOUNTI	INTEGER				REFS	86	191	
1 KPAGE	INTEGER				REFS	145	140	
640 KROW	INTEGER				REFS	145	144	
5 KTPAGE	INTEGER				REFS	138	90	
647 LAFT	INTEGER				REFS	67	125	
653 LAST	INTEGER				REFS	67	125	
2 LINES	INTEGER				REFS	198	198	
10 LINESG	INTEGER				REFS	67	130	
3 LINEST	INTEGER				REFS	67	130	
635 LOCEMP	INTEGER				REFS	119	145	
O LSIZE	INTEGER				REFS	183	186	
652 M	INTEGER				REFS	67	127	
O MATANS	INTEGER				REFS	185	187	
525 MATN	INTEGER				REFS	67	127	

SUBROUTINE	MULT	74/74	OPT=1		FTN 4.8+577	85/01/23. 08.10.44	PAGE	5
VARIABLES	SN	TYPE	RELOCATION					
O BUFFER	REAL	ARRAY	F.P.					
O DBUFF	* REAL	ARRAY	F.P.					
636 DUMMY	*	INTEGER			REFS	60	144	
641 I	INTEGER				REFS	189	145	
623 IAST	INTEGER				REFS	61	172	
625 IBST	INTEGER				REFS	100	104	
O IBUFF	INTEGER	ARRAY	F.P.		REFS	133	193	
637 ICOUNT	INTEGER				REFS	87	145	
646 ICT	INTEGER				REFS	62	86	
656 IND	INTEGER				REFS	104	145	
634 INDEX	INTEGER				REFS	102	104	
651 INO	*	INTEGER			REFS	104	105	
630 IO	INTEGER				REFS	102	105	
O IPPOS	INTEGER	ARRAY	FILE		REFS	144	107	
O IPRINT	INTEGER				REFS	161	98	
632 IREAD	INTEGER				REFS	161	120	
614 IR1	INTEGER				REFS	161	124	
617 IR2	INTEGER				REFS	161	124	
621 ISIZE	INTEGER				REFS	162	77	
624 ISTART	INTEGER				REFS	162	77	
2 ITAPEP	INTEGER				REFS	126	178	
O ITAPER	INTEGER				REFS	134	178	
1 ITAPEW	INTEGER				REFS	78	95	
633 IWRITE	INTEGER				REFS	80	121	
655 J	INTEGER				REFS	90	125	
615 JC1	INTEGER				REFS	99	109	
620 JC2	INTEGER				REFS	99	109	
622 JC2X2	INTEGER				REFS	89	99	
626 JROW	INTEGER				REFS	89	99	
644 J2CT	INTEGER				REFS	87	119	
7 KBPAGE	INTEGER				REFS	80	121	
4 KLABEL	INTEGER				REFS	174	176	
O KOUNT	INTEGER				REFS	86	144	
11 KOUNTH	INTEGER				REFS	86	144	
12 KOUNTI	INTEGER				REFS	67	125	
1 KPAGE	INTEGER				REFS	67	125	
640 KROW	INTEGER				REFS	119	145	
5 KTPAGE	INTEGER				REFS	67	127	
647 LAFT	INTEGER				REFS	153	153	
653 LAST	INTEGER				REFS	185	186	
2 LINES	INTEGER				REFS	183	186	
10 LINESG	INTEGER				REFS	67	127	
3 LINEST	INTEGER				REFS	67	127	
635 LOCEMP	INTEGER				REFS	185	187	
O LSIZE	INTEGER				REFS	67	127	
652 M	INTEGER				REFS	83	186	
O MATANS	INTEGER				REFS	124	125	
525 MATN	INTEGER				REFS	124	125	

SUBROUTINE	MULT	74/74	OPT=1		FTN 4.8+577	85/01/23. 08.10.44	PAGE	5
VARIABLES	SN	TYPE	RELOCATION					
O BUFFER	REAL	ARRAY	F.P.					
O DBUFF	* REAL	ARRAY	F.P.					
636 DUMMY	*	INTEGER			REFS	60	144	
641 I	INTEGER				REFS	189	145	
623 IAST	INTEGER				REFS	61	172	
625 IBST	INTEGER				REFS	100	104	
O IBUFF	INTEGER	ARRAY	F.P.		REFS	133	193	
637 ICOUNT	INTEGER				REFS	87	145	
646 ICT	INTEGER				REFS	62	86	
656 IND	INTEGER				REFS	104	105	
634 INDEX	INTEGER				REFS	102	105	
651 INO	*	INTEGER			REFS	104	105	
630 IO	INTEGER				REFS	102	105	
O IPPOS	INTEGER	ARRAY	FILE		REFS	144	107	
O IPRINT	INTEGER				REFS	161	98	
632 IREAD	INTEGER				REFS	161	120	
614 IR1	INTEGER				REFS	161	124	
617 IR2	INTEGER				REFS	161	124	
621 ISIZE	INTEGER				REFS	162	77	
624 ISTART	INTEGER				REFS	162	77	
2 ITAPEP	INTEGER				REFS	126	178	
O ITAPER	INTEGER				REFS	134	178	
1 ITAPEW	INTEGER				REFS	78	95	
633 IWRITE	INTEGER				REFS	80	121	
655 J	INTEGER				REFS	90	125	
615 JC1	INTEGER				REFS	99	109	
620 JC2	INTEGER				REFS	99	109	
622 JC2X2	INTEGER				REFS	89	99	
626 JROW	INTEGER				REFS	89	99	
644 J2CT	INTEGER				REFS	87	119	
7 KBPAGE	INTEGER				REFS	80	121	
4 KLABEL	INTEGER				REFS	174	176	
O KOUNT	INTEGER				REFS	86	144	
11 KOUNTH	INTEGER				REFS	86	144	
12 KOUNTI	INTEGER				REFS	67	125	
1 KPAGE	INTEGER				REFS	67	125	
640 KROW	INTEGER				REFS	119	145	
5 KTPAGE	INTEGER				REFS	67	127	
647 LAFT	INTEGER				REFS	153	153	
653 LAST	INTEGER				REFS	185	187	
2 LINES	INTEGER				REFS	183	186	
10 LINESG	INTEGER				REFS	67	127	
3 LINEST	INTEGER				REFS	67	127	
635 LOCEMP	INTEGER				REFS	185	187	
O LSIZE	INTEGER				REFS	67	127	
652 M	INTEGER				REFS	83	186	
O MATANS	INTEGER				REFS	124	125	
525 MATN	INTEGER				REFS	124	125	

SUBROUTINE	MULT	74/74	OPT=1		FTN 4.8+577	85/01/23. 08.10.44	PAGE	5
VARIABLES	SN	TYPE	RELOCATION					
O BUFFER	REAL	ARRAY	F.P.					
O DBUFF	* REAL	ARRAY	F.P.					
636 DUMMY	*	INTEGER			REFS	60	144	
641 I	INTEGER				REFS	189	145	
623 IAST	INTEGER				REFS	61	172	
625 IBST	INTEGER				REFS	100	104	
O IBUFF	INTEGER	ARRAY	F.P.		REFS	133	193	
637 ICOUNT	INTEGER				REFS	87	145	
646 ICT	INTEGER				REF			

SUBROUTINE MULT 74/74 OPT=1

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```
74 BUFFER(M)=DBUFF(M)
    IF(MATNM(1).EQ.MATN) GO TO 101
    CALL PUTROW (MATANS,1,BUFFER,JC2)
175   GO TO 100
101   CALL PUTROW (MATANS,2,BUFFER,JC2)
100   CONTINUE
    IF(IPRINT.NE.1) GO TO 210
    IF((LINES-KOUNT).LT.2) KOUNT=LINES
180   CALL TITLES(2)
    WRITE(1TAPEW,250) I
    KOUNT=KOUNT+2
    LAST=0
205   CONTINUE
    NEXT=LAST+1
    LAST=LAST+8
    IF(LAST.GT.JC2) LAST=JC2
    CALL TITLES(2)
    WRITE(1TAPEW,80) (BUFFER(J),J=NEXT,LAST)
    KOUNT=KOUNT+1
    IF(LAST.LT.JC2) GO TO 205
210   CONTINUE
    IF(I.LT.IR1) GO TO 2
    GO TO 1000
777   IND=31
    CALL TITLES(2)
    WRITE(1TAPEW,778) IND
    KOUNT=KOUNT+1
1000  CONTINUE
    CALL DCLOSE (MAT1)
    CALL DCLOSE (MAT2)
    CALL DCLOSE (MATANS)
    CALL DCLOSE (MTEMP1)
    CALL DCLOSE (MTEMP2)
    CALL TIMEB (9,9HFROM MULT)
    CALL MESSAGE (2, 4, 4HMULT)
200   C FORMAT STATEMENTS
    C
210   81 FORMAT(10X, 9HMATRIX ( ,2A4,4H ),'14,7H ROWS, .14,8H COLUMNS./)
    7  FORMAT(/,10X, 4IHTOTAL MATRIX EXCEEDS CORE STORAGE ..(MULT))
    250  FORMAT(/,10X, 3H1=.15)
    80  FORMAT(10X, 1P8E15 .6)
    778 FORMAT(10X, 1O(1H*)), 16HDIMENSION ERROR .14, 1O(1H*)
215   C
    99 RETURN
    END
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3	MULT	41 216

SUBROUTINE MULT      74/74      OPT=1      FTN 4.8+577      85/01/23. 08.10.44      PAGE 3

```

115      C KROW = LAST ROW OF B IN CORE
         C I=O
         C IF THIS IS THE LAST TIME THROUGH - WRITE MATRIX LABEL FOR C;
         C IF NOT - WRITE SCRATCH MATRIX LABEL
         C IF (KROW-IR2) .GT. 6
         4 NFMOUT = IPOS(MOUT)
         CALL PUDLAB (BHMULT O1,MOUT, MATNAM,NFMOUT,IR1,JC2)
         GO TO 2
       6 ASSIGN 73 TO IWRITE
         NFANS = IPOS(MATANS)
         CALL PUDLAB (BHMULT O2,MATANS, MATNAM,NFANS,IR1,JC2)
120      IF(IPRINT.NE.1) GO TO 200
         KOUNT=LINE$ CALL TITLES(2)
         WRITE(ITAPEW,81) MATNAM,IR1,JC2
         KOUNT=KOUNT+2
125      200 CONTINUE
         C LOOP ON ROWS
         C 2 I=I+1
130      GO TO 18
         LI CONTROLS USE OF SCRATCH TAPES OR DISKS
         C INITIALIZE C TO ZERO OR PREVIOUS C
         16 DO 17 J2CT=1,JC2
         17 DBUFF(J2CT)=0.
         GO TO 20
135      18 CALL GETROW (MIN 1,BUFFER,JC2X2)
         FIRST JC2X2 LOCATIONS OF BUFFER ARE FOR
         DOUBLE PRECISION ACCUMULATION OF MATANS
         C 20 CONTINUE
         25 CALL GETROW (MAT1,O,BUFFER(JC2X2+1),ICT)
         CALL ENMMPY (BUFFER,DBUFF,DBUFF,IROW,KROW)
         THIS ROUTINE MULTIPLIED A ROW OF MAT1 BY A PARTITION OF MAT2
         C GENERATING A PARTIAL ROW OF ANSWER
         GO TO 1WRITE (71,73)
         71 CALL PUTROW (MOUT,2,BUFFER,JC2X2)
         IF(I.LT.IR1) GO TO 2
         CALL DCLOSE (MOUT)
         LAFT=LINE$-KOUNT
         IF(LAFT.LT.2) KOUNT=LINE$
         CALL TITLES(2)
         WRITE(ITAPEW,7)
         KOUNT=KOUNT+2
         MIN=MOUT
         MOUT=10-MIN
         ASSIGN 18 TO IREAD
         NFMIN = IPOS(MIN)
         CALL GEDLAB (BHMULT O3,MIN ,MATNAM,NFMIN ,ICT,INO)
         NFMAT1 = IPOS(MAT1)
         CALL GEDLAB (BHMULT O4,MAT1,NAME ,NFMAT1,IR1,JC1)
         IROW=KROW+1
         NROW=KROW
         INDEX=ISTART+1
         LOCEMP=ISIZE-ISTART
         GO TO 12
       73 CONTINUE
         C TRUNCATE TO SINGLE PRECISION FOR FINAL ANSWER
140      160
         165
         170
  
```

SUBROUTINE MULT 74/74 OPT=1

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```

CIBM ENDING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      59
C
C DIMENSION BUFFER(1)          MULT 59
C DIMENSION DBUFF(1)           MULT 60
C DIMENSION IBUFF(1)            MULT 61
C DIMENSION MATNAME(2)         MULT 62
C DIMENSION NAME(2)            MULT 63
C
C COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP MULT 64
C COMMON /CLIST/ KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE MULT 65
C 1 COMMON /CONSTS/ NO,YES    MULT 66
C COMMON /FILE/ IPOS          MULT 67
C
C DATA INITIALIZATION          MULT 68
C CALL PROGNA (4H(MUL,4HT ))   MULT 69
C CALL MESSAGE (128,2BHMULT - MULTIPLY TWO MATRICES) MULT 70
C CALL TIMEB (11.11HFROM MULT ) MULT 71
C DATA MATN/4HCORN/            MULT 72
C
C NFMAT1 = IPOS(MAT1)          MULT 73
C CALL GEDLAB (8HMULT O1,MAT1,NAME ,NFMAT1,IR1,JC1) MULT 74
C NFMAT2 = IPOS(MAT2)          MULT 75
C CALL GEDLAB (8HMULT O2,MAT2,NAME1 ,NFMAT2,IR2,JC2) MULT 76
C
C TEST DIMENSIONS FOR CONFORMABILITY
C IF (JC1.NE.IR2) GO TO 777   MULT 77
C
C ISIZE = LSIZE                MULT 78
C 1 JC2X2=JC2+JC2              MULT 79
C
C IAST=JC2X2+1                 MULT 80
C ISTART=IAST+JC1               MULT 81
C
C ALLOCATE SPACE FOR A ROW OF MAT1          MULT 82
C IBST=IAST+1                   MULT 83
C
C JROW=1                        MULT 84
C
C IAST=JC2X2+1                 MULT 85
C ISTART=IAST+JC1               MULT 86
C
C ALLOCATE SPACE FOR A DOUBLE PRECISION ROW OF ANSWER
C
C IBST=IBST+1                   MULT 87
C
C JROW=1                        MULT 88
C
C IAST=JC2X2+1                 MULT 89
C ISTART=IAST+1                 MULT 90
C
C IROW=0                         MULT 91
C
C I0=MTEMP1+MTEMP2              MULT 92
C MOUT=MTEMP1                   MULT 93
C
C ZERO OUT OR READ C           MULT 94
C ASSIGN 16 TO IREAD            MULT 95
C
C GENERATE INTERMEDIATE OR FINAL RESULTS
C ASSIGN 71 TO IWRITE           MULT 96
C INDEX=IAST+1                  MULT 97
C
C LOCEMP=I0-IAST                MULT 98
C
C 10 CALL GETROW (MAT2,-1,DUMMY,ICOUNT) MULT 99
C
C FIND OUT IF ANOTHER ROW OF MAT2 WILL FIT
C IF (LOCEMP-ICOUNT) 15,15,12 MULT 100
C
C 12 CONTINUE                     MULT 101
C
C CALL GETROW (MAT2,O,BUFFER(INDEX+1),ICOUNT) MULT 102
C
C LOCEMP=LOCEMP-ICOUNT-1        MULT 103
C
C IBUFF(INDEX)=INDEX+ICOUNT+1   MULT 104
C INDEX=IBUFF(INDEX)             MULT 105
C
C IROW=IROW+1                    MULT 106
C
C IF (IROW-IR2) 10,15,15        MULT 107
C
C 15 KROW=IROW                  MULT 108
C
C HAVE A PARTITION OF MATRIX MAT2 IN BUFFER
C
C IAST = START OF MATRIX A     MULT 109
C IBST = START OF MATRIX B     MULT 110
C
C IROW = FIRST ROW OF B IN CORE
C

```



SUBROUTINE UNFIL      74/74      OPT=1

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COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
		6 IUMPLI (1)
		9 IUTPGT (1)
		12 IUMPL (1)
		15 IFSLT (1)
		18 IUQA (1)
		21 IFQAT (1)
		24 IUPHAT (1)
LOCSTR	6	O IUSTRI (1)
INVERT	125	3 IFMREF (1) O INVERT (1) 3 AORD (30) 123 IPREV (1)
		7 IFMPLI (1) 10 IUPATF (1) 13 IFMPL (1) 16 IUDLT (1) 19 IFQA (1) 22 IUPHA (1) 25 IFPHAT (1) 1 IFSTRI (1) 4 IUMOD (1) 1 IUAR (1) 33 IPERM (30) 124 NDQFT (1)

STATISTICS

PROGRAM LENGTH	511B	329
CM LABELLED COMMON LENGTH	452B	298
S2000B CM USED		

SUBROUTINE	UNFILE	74/74	OPT=1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	13
STATEMENT LABELS		DEF LINE	REFERENCES					
453 1200		413	56					
455 1300		417	57					
457 9999		421	118	340	346	351	354	2 IRED (1)
			411	415				5 MSADD (1)
COMMON BLOCKS	KLUES	LENGTH	MEMBERS - BIAS NAME(LENGTH)					8 VOES (1)
	24		O KLUSE (1)	1 KLUNAL (1)				11 NBAR (1)
			3 KLUMD (1)	4 KLUBAL (1)				14 DEL (1)
			6 NPASS (1)	7 IDNOPT (1)				17 NNN (1)
			9 EPS1 (1)	10 DWMAX (1)				20 KLUB (1)
			12 NFIX (1)	13 D (1)				23 DBAL (1)
			15 EPS2 (1)	16 NCYC (1)				2 NOYDOF (1)
			18 IBAND (1)	19 IFIN (1)				5 NDESYS (1)
			21 KLUQ (1)	22 MORBAL (1)				2 IOUT1 (1)
			O NSTMEM (1)	1 NSTDOF (1)				5 IUGO2 (1)
			3 NLOPT (1)	4 NDESNO (1)				8 IUSCR (1)
			O IUIN1 (1)	1 IUIN2 (1)				11 IFS2 (1)
			3 IOUT2 (1)	4 IUGO1 (1)				14 IUCD (1)
			6 IUGO3 (1)	7 IUGO4 (1)				17 IFA (1)
			9 IFSCR (1)	10 IFS1 (1)				20 IUMEMN (1)
			12 IFS3 (1)	13 IFS4 (1)				23 IFSTFN (1)
			15 IUPR (1)	16 IUA (1)				26 IUB (1)
			18 IUY (1)	19 IFY (1)				29 IFDESO (1)
			21 IFMEMN (1)	22 IUSTFN (1)				32 IUADDI (1)
			24 IUKS (1)	25 IFKS (1)				35 IFBALI (1)
			27 IFB (1)	28 IUDES0 (1)				38 IUWTI (1)
			30 IUMDBI (1)	31 IFMDB1 (1)				41 IFMEMO (1)
			33 IFADDI (1)	34 IUBALI (1)				44 IUDESN (1)
			36 IUDESI (1)	37 IFDESI (1)				47 IFMD (1)
			39 IFWTI (1)	40 IUMEMO (1)				50 IUSTFO (1)
			42 IUBT (1)	43 IFBT (1)				53 IFMDB (1)
			45 IFDESN (1)	46 IUMD (1)				56 IUBAL (1)
			48 IUMEMF (1)	49 IFMEMF (1)				59 IFDESF (1)
			51 IFSTFO (1)	52 IUMDB (1)				62 IUDUM1 (1)
			54 IUADD (1)	55 IFADD (1)				65 IUDUM2 (1)
			57 IFBAL (1)	58 IUDESF (1)				68 IUL (1)
			60 IUWT (1)	61 IFWT (1)				71 IFYT (1)
			63 IFDUM1 (1)	64 IUDUM2 (1)				74 IUZR (1)
			66 IFDUM3 (1)	67 IFDUM3 (1)				77 IFLR (1)
			69 IFL (1)	70 IUVT (1)				79 IFBR (1)
			72 IUZ (1)	73 IFZ (1)				80 IUPHTF (1)
			75 IFZR (1)	76 IULR (1)				83 IFMODM (1)
			78 IUBR (1)	79 IFBR (1)				86 IUPHT (1)
			81 IFPHTF (1)	82 IUMODM (1)				89 IFQT (1)
			84 IUMODK (1)	85 IFMODK (1)				92 IUPH (1)
			87 IFPHT (1)	88 IUQT (1)				95 IFINCM (1)
			90 IUQ (1)	91 IFQ (1)				2 LINES (1)
			93 IFPH (1)	94 IWINCM (1)				5 KTPAGE (1)
			96 IWINCK (1)	97 IFINCK (1)				8 LINESG (1)
CLIST	11	O KOUNT (1)	1 KPAGE (1)					
		3 LINEST (1)	4 KLABEL (1)					
		6 NPAGE (1)	7 KBPAGE (1)					
		9 KOUNTH (1)	10 KOUNTI (1)					
CSETUP	1	O IOINC (1)						
KLUFF	1	O KFREE (1)						
PLAYFF	26	O IUMOFF (1)						2 IUDLTI (1)
		? ? ? ? ? (1)						R FESTIV (1)

SUBROUTINE UNFIL			74/74 OPT=1		FTN 4.8+577		85/01/23 . 08 . 10 . 44		PAGE 12	
VARIABLES	SN	TYPE	RELOCATION SIZES		REFS	REFS	REFS	REFS	REFS	REFS
2 NDYDOF		INTEGER			165	166	168	169	100	112
500 NEXT		INTEGER			182	183	185	186	173	174
					238	239	243	244	230	231
					298	299	301	302	247	248
					314	315	317	318	306	307
					110	114	135	155	95	98
					179	183	186	161	166	174
					239	244	248	216	220	226
					302	307	312	251	273	294
								315	318	299
14 NFIX		INTEGER								
21 NNN		INTEGER								
3 NNLOPT		INTEGER								
6 NPAGE		INTEGER								
6 NPASS		INTEGER								
1 NSTDOF		INTEGER								
0 NSTMEM		INTEGER								
77 NSTOR		INTEGER								
10 VDES		REAL								
EXTERNALS		TYPE								
MESSAGE		TYPE								
PROGNA		TYPE								
STATEMENT LABELS										
33 10					59	48	48	48	48	48
71 15					101	96	96	96	96	96
74 20					106	89	89	89	89	89
104 25					115	111	111	111	111	111
106 30					117	104	104	104	104	104
107 33					121	49	49	49	49	49
123 35					132	122	122	122	122	122
153 100					158	152	152	152	152	152
160 115					163	156	156	156	156	156
172 120					176	163	163	163	163	163
177 140					181	176	176	176	176	176
204 400					188	124	124	124	124	124
205 500					193	60	60	60	60	60
232 505					223	217	217	217	217	217
237 507					228	221	221	221	221	223
251 510					241	228	228	228	228	237
256 515					246	241	241	241	241	241
271 520					262	253	253	253	253	253
274 530					267	260	260	260	260	260
0 550					INACTIVE	270	270	270	270	270
321 600					291	285	285	285	285	285
326 615					296	289	289	289	289	291
340 620					309	296	296	296	296	296
345 640					313	309	309	309	309	305
352 1000					320	190	190	190	190	190
376 1040					348	50	50	50	50	50
401 1060					353	51	51	51	51	51
405 1080					358	52	52	52	52	52
416 1100					369	53	53	53	53	53
437 1125					395	54	54	54	54	54
450 1150					409	55	55	55	55	55

SUBROUTINE	UNFILE	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23. 08.10.44	PAGE	11
VARIABLES	SN	TYPE		PLAYFF	29	DEFINED	229	
6	IUMPLI	INTEGER		LOCSTR	33	44	42	
2	IUMREF	INTEGER		PLACES	8	80	276	DEFINED
2	IUOUT1	INTEGER		PLACES	8	133	159	67
3	IUOUT2	INTEGER		PLACES	177	153	164	200
				PLAYFF	181	184	271	167
12	IUPATF	INTEGER		PLAYFF	310	313	286	297
134	IUPH	INTEGER		PLAYFF	303	316	292	300
26	IUPHA	INTEGER		PLAYFF	REFS	29	29	201
30	IUPHAT	INTEGER		PLAYFF	REFS	29	29	
126	IUPHT	INTEGER		PLAYFF	REFS	29	29	
126	IUPR	INTEGER		PLAYFF	REFS	29	29	
17	IUQ	INTEGER		PLAYFF	REFS	29	29	
132	IUQA	INTEGER		PLAYFF	REFS	29	29	
22	IUCAT	INTEGER		PLAYFF	REFS	29	29	
24	IUQT	INTEGER		PLAYFF	REFS	29	29	
130	IUSCR	INTEGER		PLAYFF	REFS	29	29	
10	IUSLT	INTEGER		PLAYFF	REFS	29	29	
16	IUSLT1	INTEGER		PLAYFF	REFS	29	29	
4	IUSTFN	INTEGER		PLAYFF	REFS	29	29	
26	IUSTFO	INTEGER		PLAYFF	REFS	29	29	
62				PLAYFF	REFS	29	29	
0	IUSTRI	INTEGER		LOCSTR	REFS	29	29	
10	IUTPGT	INTEGER		PLAYFF	REFS	29	29	
74	IUWT	INTEGER		PLAYFF	REFS	29	29	
46	IUWT1	INTEGER		PLAYFF	REFS	29	29	
22	IUY	INTEGER		PLAYFF	REFS	29	29	
106	IUYT	INTEGER		PLAYFF	REFS	29	29	
110	IUZ	INTEGER		PLAYFF	REFS	29	29	
112	IUZR	INTEGER		PLAYFF	REFS	29	29	
0	JUMP	INTEGER		PLAYFF	REFS	29	29	
7	KBPAGE	INTEGER		CLIST	REFS	25	25	
0	KFREE	INTEGER		KLUFF	REFS	28	49	
4	KLABEL	INTEGER		CLIST	REFS	28	50	
24	KLUB	INTEGER		KLUES	REFS	25	56	
4	KLUBAL	INTEGER		KLUES	REFS	25	57	
3	KLUMD	INTEGER		KLUES	REFS	25	57	
1	KLUNAL	INTEGER		KLUES	REFS	25	57	
25	KLUQ	INTEGER		KLUES	REFS	25	57	
0	KLUSE	INTEGER		KLUES	REFS	25	57	
4	KOUNT	INTEGER		CLIST	REFS	25	57	
11	KOUNTH	INTEGER		CLIST	REFS	25	57	
12	KOUNTI	INTEGER		CLIST	REFS	25	57	
1	KPAGE	INTEGER		CLIST	REFS	25	57	
5	KTPAGE	INTEGER		CLIST	REFS	25	57	
2	LINES	INTEGER		CLIST	REFS	25	57	
10	LINESG	INTEGER		CLIST	REFS	25	57	
3	LINEST	INTEGER		CLIST	REFS	25	57	
26	MORBAL	INTEGER		CLIST	REFS	25	57	
5	MSADD	INTEGER		CLIST	REFS	25	57	
13	NBAR	INTEGER		CLIST	REFS	25	57	
20	NCYC	INTEGER		CLIST	REFS	25	57	
4	NDESMO	INTEGER		CLIST	REFS	25	57	
5	NDESYS	INTEGER		CLIST	REFS	25	57	
174	NNFFT	INTEGER		CLIST	REFS	25	57	

SUBROUTINE	UNFILE	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23. 08.10.44	PAGE	11
VARIABLES	SN	TYPE		PLAYFF	29	DEFINED	229	
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30	IUPHAT	INTEGER		PLAYFF	REFS	29	29	
126	IUPHT	INTEGER		PLAYFF	REFS	29	29	
126	IUPR	INTEGER		PLAYFF	REFS	29	29	
17	IUQ	INTEGER		PLAYFF	REFS	29	29	
22	IUQA	INTEGER		PLAYFF	REFS	29	29	
24	IUCAT	INTEGER		PLAYFF	REFS	29	29	
24	IUQT	INTEGER		PLAYFF	REFS	29	29	
130	IUSCR	INTEGER		PLAYFF	REFS	29	29	
10	IUSLT	INTEGER		PLAYFF	REFS	29	29	
16	IUSLT1	INTEGER		PLAYFF	REFS	29	29	
4	IUSTFN	INTEGER		PLAYFF	REFS	29	29	
26	IUSTFO	INTEGER		PLAYFF	REFS	29	29	
62				PLAYFF	REFS	29	29	
0	IUSTRI	INTEGER		LOCSTR	REFS	29	29	
10	IUTPGT	INTEGER		PLAYFF	REFS	29	29	
74	IUWT	INTEGER		PLAYFF	REFS	29	29	
46	IUWT1	INTEGER		PLAYFF	REFS	29	29	
22	IUY	INTEGER		PLAYFF	REFS	29	29	
106	IUYT	INTEGER		PLAYFF	REFS	29	29	
110	IUZ	INTEGER		PLAYFF	REFS	29	29	
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7	KBPAGE	INTEGER		CLIST	REFS	25	25	
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24	KLUB	INTEGER		KLUES	REFS	25	56	
4	KLUBAL	INTEGER		KLUES	REFS	25	57	
3	KLUMD	INTEGER		KLUES	REFS	25	57	
1	KLUNAL	INTEGER		KLUES	REFS	25	57	
25	KLUQ	INTEGER		KLUES	REFS	25	57	
0	KLUSE	INTEGER		KLUES	REFS	25	57	
4	KOUNT	INTEGER		CLIST	REFS	25	57	
11	KOUNTH	INTEGER		CLIST	REFS	25	57	
12	KOUNTI	INTEGER		CLIST	REFS	25	57	
1	KPAGE	INTEGER		CLIST	REFS	25	57	
5	KTPAGE	INTEGER		CLIST	REFS	25	57	
2	LINES	INTEGER		CLIST	REFS	25	57	
10	LINESG	INTEGER		CLIST	REFS	25	57	
3	LINEST	INTEGER		CLIST	REFS	25	57	
26	MORBAL	INTEGER		CLIST	REFS	25	57	
5	MSADD	INTEGER		CLIST	REFS	25	57	
13	NBAR	INTEGER		CLIST	REFS	25	57	
20	NCYC	INTEGER		CLIST	REFS	25	57	
4	NDESMO	INTEGER		CLIST	REFS	25	57	
5	NDESYS	INTEGER		CLIST	REFS	25	57	
174	NNFFT	INTEGER		CLIST	REFS	25	57	

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E)	VIBIFO	2	
	VIBIFO	3	
	VIBIFO	4	
,CHK(43,43),F(43)	VIBIFO	5	
	VIBIFO	6	
	VIBIFO	7	
	VIBIFO	8	
	VIBIFO	9	
	VIBIFO	10	
	VIBIFO	11	
	VIBIFO	12	
	VIBIFO	13	
	VIBIFO	14	
	VIBIFO	15	
	VIBIFO	16	
	VIBIFO	17	
	VIBIFO	18	
LABEL,KTPAGE,NPAGE	VIBIFO	19	
COLCOLST,KTABLO,NPAGEA	VIBIFO	20	
	VIBIFO	21	
	VIBIFO	22	
	VIBIFO	23	
	VIBIFO	24	
	VIBIFO	25	
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	VIBIFO	43	
	VIBIFO	44	
	VIBIFO	45	
	VIBIFO	46	
	VIBIFO	47	
	VIBIFO	48	
	VIBIFO	49	
	VIBIFO	50	
	VIBIFO	51	
	VIBIFO	52	
	VIBIFO	53	
	VIBIFO	54	
	VIBIFO	55	
	VIBIFO	56	

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      C EQUIVALENCE (Q(1850),ELMTMD(1,1))          VIBIFO 59
      C DATA NONE /4HNONE/                         VIBIFO 60
      C DATA NAME3/4HE1GE,4HNNS,                  VIBIFO 61
      1   DATA NAME1 /4HM0DM,4HASS/                VIBIFO 62
      C DATA NAME2 /4HM0DS,4HTIFF/                VIBIFO 63
      C FUNCTION DEFINITIONS                   VIBIFO 64
      C MINOF(I,J) = MINO(I,J)                  VIBIFO 65
      C MAXOF(I,J) = MAXO(I,J)                  VIBIFO 66
      C ABSF(X) = ABS(X)                         VIBIFO 67
      C ROUTINE WHICH WILL PREPARE VIBRATION INFORMATION FOR VIBIFO 68
      C FLUTTER ANALYSIS MODULE                 VIBIFO 69
      C INITIAL DATA                           VIBIFO 70
      C CALL PROGNA (4H(VIB, 4HIFO))           VIBIFO 71
      C KOLUMN = 8                            VIBIFO 72
      C IF (KREPOR .EQ. 2) KOLUMN = 4          VIBIFO 73
      C NTOTAL = NROOTS                      VIBIFO 74
      C NRIGID = 0                           VIBIFO 75
      C MODE SHAPES PHBAR, AS COMPUTED IN THE VIBRATION SOLUTION, WERE STORED VIBIFO 76
      C ON AN I/O DEVICE.                   VIBIFO 77
      C 1. IF CANTILEVER MODES WERE COMPUTED (KFREE=1), PHBAR IS IN ABSOLUTE VIBIFO 78
      C COORDINATES.                      VIBIFO 79
      C 2. IF FREE-FREE MODES WERE COMPUTED (KFREE=2), PHBAR IS IN RELATIVE VIBIFO 80
      C (TO THE PLUG) COORDINATES.        VIBIFO 81
      C IN EITHER CASE, READ PHBAR INTO CORE AND NORMALIZE SUCH THAT THE VIBIFO 82
      C LARGEST ABSOLUTE VALUE IN EACH MODE IS UNITY.          VIBIFO 83
      C
      C NFIL = IPOS(ISCR)
      C CALL GEDLAB (8HVIBIF001,ISCR,NAME,NFIL,IROWS,JCOLS) VIBIFO 84
      C DO 60 I=1,NROOTS                     VIBIFO 85
      C TANS5 = 1 + IROW*(I-1)               VIBIFO 86
      C ILIM = IANS5 + IROW - 1             VIBIFO 87
      C CALL GETROW (ISCR,1,BUFFER,IROW)    VIBIFO 88
      C DO 230 J=IANS5,ILIM                VIBIFO 89
      C     JB = J - IANS5 + 1              VIBIFO 90
      C     A(J) = BUFFER(JB)              VIBIFO 91
      C     IF (J GT IANS5) GOTO 82       VIBIFO 92
      C     XLARGE = A(IANS5)            VIBIFO 93
      C     IF (ABSF(A(J)) GT ABSF(XLARGE)) XLARGE = A(J)      VIBIFO 94
      C 230 CONTINUE                         VIBIFO 95
      C DO 83 J=IANS5,ILIM                VIBIFO 96
      C     A(J) = A(J) / XLARGE          VIBIFO 97
      C 83 CONTINUE                         VIBIFO 98
      C CALL DCLOSE (ISCR)                VIBIFO 99
      C
      C IF (KFREE.EQ.1) GO TO 5300      VIBIFO 100
      C
      C THIS IS A FREE-FREE ANALYSIS. DO THE FOLLOWING
      C 1. COMPUTE PLUG MOTION FOR ALL MODES (PHB)
      C 2. COMPUTE MODE SHAPES IN ABSOLUTE COORDINATES (PHAB) VIBIFO 101
      C VIBIFO 102
      C VIBIFO 103
      C VIBIFO 104
      C VIBIFO 105
      C VIBIFO 106
      C VIBIFO 107
      C VIBIFO 108
      C VIBIFO 109
      C VIBIFO 110
      C VIBIFO 111
      C VIBIFO 112
      C VIBIFO 113
      C VIBIFO 114
      C VIBIFO 115
  
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PAGE

SUBROUTINE	VIBIFO	74/74	OPT=1	FTN 4.8+577	85/01/23 . 08 . 10 . 44
115	C 3. RENORMALIZE SO THAT LARGEST (ABSOLUTE) VALUE OF EACH ABSOLUTE C MODE SHAPE (IN PHAB OR PHP) IS UNITY. FOR CONSISTENCY, THE C RELATIVE MODE SHAPES PHBAR MUST ALSO BE MODIFIED BY THE SAME C NORMALIZATION FACTORS.			VIBIFO 116 VIBIFO 117 VIBIFO 118 VIBIFO 119 VIBIFO 120 VIBIFO 121 VIBIFO 122 VIBIFO 123 VIBIFO 124 VIBIFO 125 VIBIFO 126 VIBIFO 127 VIBIFO 128 VIBIFO 129 VIBIFO 130 VIBIFO 131 VIBIFO 132 VIBIFO 133 VIBIFO 134 VIBIFO 135 VIBIFO 136 VIBIFO 137 VIBIFO 138 VIBIFO 139 VIBIFO 140 VIBIFO 141 VIBIFO 142 VIBIFO 143 VIBIFO 144 VIBIFO 145 VIBIFO 146 VIBIFO 147 VIBIFO 148 VIBIFO 149 VIBIFO 150 VIBIFO 151 VIBIFO 152 VIBIFO 153 VIBIFO 154 VIBIFO 155 VIBIFO 156 VIBIFO 157 VIBIFO 158 VIBIFO 159 VIBIFO 160 VIBIFO 161 VIBIFO 162 VIBIFO 163 VIBIFO 164 VIBIFO 165 VIBIFO 166 VIBIFO 167 VIBIFO 168 VIBIFO 169 VIBIFO 170 VIBIFO 171	
120	C PHP=-TPLUG*PHBAR WHERE TRANSFORMATION MATRIX TPLUG WAS GENERATED AND C SAVED IN SUBROUTINE FFMASS C				
125	C CALL GEDLAB(BHVBIBFOO2,IUTPGT,NAME,IFTPGT,KROW,KCOL) DO 5000 I=1,KROW CALL GETROW(IUTPGT,1,TPLUG(1,I),KCOL) 5000 CONTINUE CALL DCLOSE(IUTPGT)				
130	C NRGW=KCOL NCOL=KROW C DO 5020 I=1,NRROW DO 5020 K=1,NROOTS JO=(K-1)*NCOL B=O.O DO 5010 J=1,NCOL B=B-TPLUG(I,J)*A(J,O+J) 5010 CONTINUE PHP(I,K)=B 5020 CONTINUE C READ DYNAMIC LAMBDA MATRIX INTO CORE C				
135	I IF (KLSE.LE.0) IFDLTI = 2 CALL GEDLAB(BHVBIBFOO3,IUDLTI,NAME,IFDLTI,KROW,KCOL) DO 5030 I=1,KROW CALL GETROW(IUDLTI,1,ELAM(1,I),KCOL) 5030 CONTINUE CALL DCLOSE(IUDLTI)				
140	C LROW=KCOL LCOL=KROW C PREPARE FOR INCLUSION OF RIGID-BODY MODES IN OUTPUT FOR AFAM AND AFOM C				
145	IF (KFREE.EQ.1.OR.KLUE(38).EQ.1) GO TO 5040 NRIGID = KROW NTOTAL = NROOTS + NRIGID 5040 CONTINUE C				
150	CALL PUDLAB(BHVBIBFOO1,IUPHTF,NAME3,IFPHTF,NTOTAL,LROW)				
155	C INSERT ZEROES FOR RIGID-BODY MODES IN RELATIVE COORDINATES AND C WRITE ON I/O UNIT C				
160	IF (KFREE.EQ.1.OR.KLUE(38).EQ.1) GO TO 5046 DO 5044 N=1,NRIGID DO 5042 I=1,LROW BUFFER(I) = O.O				
165	C				
170	C				

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5042 CONTINUE
      CALL PUTROW(IUPHTF,1,BUFFER,LROW)
  5044 CONTINUE
  5046 CONTINUE
C     DO 5200 K=1,NROOTS
C        I0=(K-1)*LROW
C TRANSFER KTH RELATIVE FLEXIBLE MODE TO BUFFER
C     DO 5050 I=1,LROW
C        II=I0+I
C        BUFFER(I)=A(II)
  5050 CONTINUE
C NOW ADD LAMBDA*PHP TO KTH RELATIVE MODE AS STORED IN VARIABLE A.
C RESULT IS KTH ABSOLUTE MODE
C     DO 5070 I=1,LROW
C        B=0.0
C        DO 5060 J=1,LCOL
C           B=B+ELAM(I,J)*PHP(J,K)
  5060 CONTINUE
C        II=I0+I
C        A(II)=A(II)+B
  5070 CONTINUE
C NOW NORMALIZE KTH MODE SO THAT LARGEST (ABSOLUTE) VALUE OF EACH
C ABSOLUTE MODE (INCLUDING PLUG MOTION) IS UNITY. FOR CONSISTENCY, THE
C KTH RELATIVE MODE SHOULD BE RENORMALIZED.
C     XMAX=0.0
C     DO 5080 I=1,LROW
C        II=I0+I
C        IF (ABSF(A(II)).GT.ABSF(XMAX)) XMAX=PHP(I,K)
  5080 CONTINUE
C     DO 5090 I=1,LCOL
C        IF (ABSF(PHP(I,K)).GT.ABSF(XMAX)) XMAX=PHP(I,K)
  5090 CONTINUE
C     DO 5100 I=1,LROW
C        II=I0+I
C        A(II)=A(II)/XMAX
C        BUFFER(I)=BUFFER(I)/XMAX
  5100 CONTINUE
C     DO 5110 I=1,LCOL
C        PHP(I,K)=PHP(I,K)/XMAX
  5110 CONTINUE
C WRITE KTH RELATIVE MODE ON I/O DEVICE
C     CALL PUTROW(IUPHTF,1,BUFFER,LROW)
  5200 CONTINUE
C     CALL DCINCR/DCINTR
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VIBIFO 173
VIBIFO 174
VIBIFO 175
VIBIFO 176
VIBIFO 177
VIBIFO 178
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VIBIFO 229
```

SUBROUTINE VIBIFO 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 5

```

230      C MODIFY OTHER MODAL DATA TO INCLUDE RIGID-BODY MODES IN OUTPUT
C PASSED TO AFAM AND AFOM.
C
C     IF (KFREE.EQ.1.OR.KLUE(3B).EQ.1) GO TO 5300
C
C     SHIFT INDICES OF FREQUENCIES AND PLUG MODE SHAPES TO
C     PROVIDE ROOM FOR RIGID-BODY VALUES AT LOWER END OF
C     INDEX NUMBERS.
C
C     DO 5210 N=1,NROOTS
C       INEW = NTOTAL - N + 1
C       IOLD = NROOTS - N + 1
C       FREQ(INEW) = FREQ(IOLD)
C       DO 5205 L=1,NRIGID
C         PHP(L,INEW) = PHP(L,IOLD)
C
C     5205 CONTINUE
C     5210 CONTINUE
C
C     READ IN ASSUMED RIGID-BODY FREQUENCIES AND INSERT
C     UNIT VALUES FOR PLUG DISPLACEMENTS IN RIGID-BODY MODES.
C
C     IF (NCYC.GT.0) GO TO 5212
C     READ (1TAPER,1001) (FREQ(N),N=1,NRIGID)
C     DO 5211 N=1,NRIGID
C       IF (FREQ(N).LT.0.002) FREQ(N) = 0.002
C       RIGFRQ(N) = FREQ(N)
C
C     5211 CONTINUE
C     GO TO 5214
C
C     5212 CONTINUE
C     DO 5213 N=1,NRIGID
C       FREQ(N) = RIGFRQ(N)
C
C     5213 CONTINUE
C     5214 CONTINUE
C     DO 5220 N=1,NRIGID
C       DO 5215 K=1,NRIGID
C         PHP(K,N) = 0.0
C
C     5215 CONTINUE
C     5220 CONTINUE
C
C     SHIFT INDICES OF MODE SHAPES (OTHER THAN PLUG VALUES).
C
C     NDOF = KCOL
C     NAFLEX = NROOTS*NDOF
C     NATOTL = NAFLEX + NRIGID*NDOF
C     DO 5230 I=1,NAFLEX
C       INEW = NATOTL - I + 1
C       IOLD = NAFLEX - I + 1
C       A(INEW) = A(IOLD)
C
C     5230 CONTINUE
C
C     INSERT RIGID-BODY MODE SHAPES (OTHER THAN PLUG
C     DISPLACEMENTS) FROM LAMBDA MATRIX.
C
C     DO 5240 N=1,NRIGID
C       JI = NDOF*(N-1) + 1
  
```

SUBROUTINE VIBIFO    74/74    OPT=1

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```
JU = NDOF*N
DO 5235 J=JL,JU
      K = J - JL + 1
      A(J) = ELAM(K,N)
5235 CONTINUE
5240 CONTINUE
C
      NROTS = NTOTAL
C
5300 CONTINUE
C WRITE ABSOLUTE MODE SHAPES ON TAPE
C (PHBAR IF KFREE=1 . PHAB IF KFREE=2)
C
      IUCOM=IUPHTF
      IFCOM=IFPHTF
      IF(KFREE.EQ.1) GO TO 5310
      IUCOM=IUPATF
      IFCOM=IPATF
      5310 CONTINUE
C
      CALL PUDLAB(8HVIBIFO02,IUCOM,NAME3(1,KFREE),IFCOM,NROOTS,IROW)
      DO 320 I=1,NROOTS
      JCL = IROW*(I - 1) + 1
      JCU = I * IROW
      CALL RITVEC(JCL,JCU,BUFFER,IUCOM)
320  CONTINUE
      CALL DCLOSE(IUCOM)
C
C
      C LIST ABSOLUTE MODE SHAPES INCLUDING ALL REQUESTED DEGREES OF FREEDOM
      C
      IF(KFREE.EQ.1) GO TO 5340
      KOUNT=LINES
320  KTOP=0
      5315 CONTINUE
      KBOT=KTOP+1
      KTOP=KTOP+KOLUMN
      IF(KTOP.GT.NROOTS) KTOP=NROOTS
      CALL TITLES(2)
      IF(KOUNT.GT.KOUNTH) GO TO 5320
      WRITE(ITAPEW,4004)
      KOUNT=KOUNT+3
      5320 CONTINUE
      WRITE(ITAPEW,4005) (K,K=KBOT,KTOP)
      CALL PLB (1,1,ITAPEW)
      KOUNT=KOUNT+4
      DO 5325 I=1,LCOL
      WRITE(ITAPEW,2002) I, (PHP(I,K),K=KBOT,KTOP)
      KOUNT=KOUNT+1
      5325 CONTINUE
      IF(KTOP.EQ.NROOTS) GO TO 5330
      LEFT=LINES-KOUNT
      IF(LEFT.LT.7) KOUNT=LINES
      GO TO 5315
C
      5330 CONTINUE
```

SUBROUTINE VIBIFO 74/74 OPT=1

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```
C 5340 CONTINUE          VIBIFO 344
C   KCU = 0              VIBIFO 345
C   JCU = 0              VIBIFO 346
C   400 JCL = JCU + 1    VIBIFO 347
C   JCU = JCU + COLUMN  VIBIFO 348
C   JCU = MINOF(JCU,NROOTS) VIBIFO 349
C   INC = IROW*(JCU-JCL) VIBIFO 350
C   MIN = KCU            VIBIFO 351
C   MAX = KCU + INC    VIBIFO 352
C   KOUNT = LINES        VIBIFO 353
C   NCOLS = 3             VIBIFO 354
C   DO 500 I=1,IROW      VIBIFO 355
C   CALL TITLES (2)     VIBIFO 356
C   IF (I .GT. 1 .OR. JCL .GT. 1) GO TO 405
C   NROWS = 1             VIBIFO 357
C   KTABLE = 2             VIBIFO 358
C   CALL PTABLE (1.52,52) VIBIFO 359
C   1 HFREQUENCIES, GENERALIZED MASSES, AND MODE SHAPES FOR )
C   NROWS = 0             VIBIFO 360
C   KTABLE = 2             VIBIFO 361
C   CALL PTABLE (2.32,32) VIBIFO 362
C   1 HALL REQUESTED DEGREES OF FREEDOM)
C   405 CONTINUE          VIBIFO 363
C   IF (KOUNT .GT. KOUNTH) GO TO 410
C   WRITE (ITAPEW,2000)
C   CALL PLB (1,1,ITAPEW)
C   WRITE (ITAPEW,2001) (J, J=JCL,JCU)
C   CALL PLB (1,1,ITAPEW)
C   KOUNT = KOUNT + 5      VIBIFO 364
C   410 CONTINUE          VIBIFO 365
C   KCL = I + MIN         VIBIFO 366
C   KCU = I + MAX         VIBIFO 367
C   KOUNT = KOUNT + 1     VIBIFO 368
C   WRITE (ITAPEW,2002) I, (A(K), K=KCL,KCU, IROW)
C   500 CONTINUE          VIBIFO 369
C   IF (JCU .LT. NROOTS) GO TO 400
C
C
C   C READ IN (CANTILEVER) MASS MATRIX FROM I/O DEVICE
C   C IPOS(ISCR)=IFMD
C   NFIL = IPOS(ISCR)
C   CALL GEDLAB(8HVIBIFO04,ISCR,NAME,NFIL,IROWS,JCOLS)
C   DO 43 I=1,IROW
C   IANS6 = (((I-1)*2 + (I-1)/2) + 1
C   ILIM2 = IANS6 + 1 - 1
C   JCOL = ILIM2 - IANS6 + 1
C   CALL GETROW (ISCR,1,BUFFER,IROW)
C   DO 110 K=IANS6,ILIM2
C   KB = K - IANS6 + 1
C   110 A(K) = BUFFER(KB)
C   43 CONTINUE
C   CALL DCLOSE(ISCR)
```

SUBROUTINE VIBIFO 74/74 OPT=1

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```

400      C
        C GENERALIZED MASS
        C FORM PHI(TRANSPOSE) * MASS * PHI
        C USE ABSOLUTE MODE SHAPES
        C
        DO 45  I=1,NROOTS
          CALL GEOLAB(8HVIBIFO03,IUCOM,NAME,IFCOM,IROW,JCOLS)
        DO 46  I=1,I
          CALL GETROW(IUCOM,1,BUFFER,IROW)
        46 CONTINUE
        DO 47  J=1,IROW
          DO 48  K=1,IROW
            IF (K.GT.J) GO TO 49
            IANS2 = ((J-1)*(J-1) + (J-1))/2 + K
            GO TO 52
        49  IANS2 = ((K-1)*(K-1) + (K-1))/2 + J
        52  Q(K) = A(IANS2)
        48 CONTINUE
        SUM = O.EO
        QO(J) = SCAPRO(Q(1),BUFFER(1),SUM,IROW,1,1)
        47 CONTINUE
        DO 53  II=1,NROOTS
          IF (II.LT.I) GO TO 53
          IF (II.EQ.I) GO TO 54
          CALL GETROW(IUCOM,1,BUFFER,IROW)
        54  SUM = O.EO
        QMASS(II,II) = SCAPRO(QQ(1),BUFFER(1),SUM,IROW,1,1)
        QMASS(I,II) = QMASS(II,II)
        53 CONTINUE
        CALL DCLOSE(IUCOM)
        45 CONTINUE
        C
        C IF KFREE=2, INCREMENT THE GENERALIZED MASS TO ACCOUNT FOR THE
        C PRESENCE OF THE PLUG.  PHP(TRAN)*EMP*PHP
        C
        435  IF (KFREE.EQ.1) GO TO 5400
        C
        DO 5370  I=1,NROOTS
          DO 5370  L=1,NROOTS
          B=0.O
          DO 5360  K=1,LCOL
            DO 5360  J=1,LCOL
              B=B+PHP(J,I)*EMP(J,K)*PHP(K,L)
        5360 CONTINUE
          QMASS(I,L)=QMASS(I,L)+B
        5370 CONTINUE
        C
        5400 CONTINUE
        C
        C WRITE GENERALIZED MASS MATRIX OUT AS A VECTOR CONTAINING
        C DIAGONAL TERMS ONLY
        DO 630  I=1,NROOTS
          BUFFER(I) = QMASS(I,I)
        630 CONTINUE
        CALL PUDLAB(8HVIBIFO03,IUCOM,NAME1,IFMODM,NROOTS,NROOTS)
        455

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SUBROUTINE VIBIFO 74/74 OPT=1

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```
C CALL DCLOSE (IUMODM)          VIBIFO 458
C C FORM GENERALIZED STIFFNESS MATRIX (DIAGONAL ELEMENTS ONLY) VIBIFO 459
C DO 620 I=1,NROOTS            VIBIFO 460
C     BUFFER(I) = QMASS(I,1) * (FREQ(I)*6.28318)**2      VIBIFO 461
C 620 CONTINUE                  VIBIFO 462
C     CALL PUDLAB(BHVIBIF004,IUMODK,NAME2,IFMODK,NROOTS,NROOTS) VIBIFO 463
C     CALL PUTROW (IUMODK, 1, BUFFER(1), NROOTS)           VIBIFO 464
C     CALL DCLOSE (IUMODK)          VIBIFO 465
C
C C LIST GENERALIZED MASSES   VIBIFO 466
C KOUNT=LINES                 VIBIFO 467
C     JCU = 0                   VIBIFO 468
C     600 JCL = JCU + 1         VIBIFO 469
C     JCU = JCU + KOLUMN       VIBIFO 470
C     JCU = MINOF (JCU,NROOTS) VIBIFO 471
C LEFT=LINES-KOUNT             VIBIFO 472
C IF (LEFT.LT.15) GO TO 602    VIBIFO 473
C CALL PLB(1,4,ITAPEW)        VIBIFO 474
C WRITE(ITAPEW,3001) (NC,NC=JCL,JCU) VIBIFO 475
C CALL PLB(1,1,ITAPEW)        VIBIFO 476
C KOUNT=KOUNT+6                VIBIFO 477
C GO TO 605                    VIBIFO 478
C 602 KOUNT=LINES             VIBIFO 479
C 605 CONTINUE                  VIBIFO 480
C DO 700 MR=1,NROOTS          VIBIFO 481
C     CALL TITLES (2)          VIBIFO 482
C     IF (KOUNT.GT.KOUNTH) GO TO 610
C     IF (KFREE.EQ.1) WRITE(ITAPEW,3000)
C     IF (KFREE.EQ.2) WRITE(ITAPEW,3003)
C     WRITE(ITAPEW,3004)
C     CALL PLB (1,1,ITAPEW)
C     WRITE (ITAPEW,3001) (NC, NC=JCL, JCU)
C     CALL PLB(1,1,ITAPEW)
C     KOUNT=KOUNT+5
C 610 CONTINUE
C     KOUNT = KOUNT + 1
C     WRITE (ITAPEW,3002) MR, (QMASS(MR,NC), NC=JCL, JCU)
C 700 CONTINUE
C     IF (JCU .LT. NROOTS) GO TO 600
C
C 500
C IF KFREE=2, DO THE FOLLOWING.
C A. MOMENTUM CHECK
C     EMOM=LAMBDA(TRAN)*MD*PHI(ABS) + EMP*PHP
C     B. COMPUTE THE GENERALIZED MASS ASSOCIATED WITH THE RIGID BODY MODES
C     RMAS=LAMBDA(TRAN)*MD*LAMBD + EMP
C     IF (KFREE.NE.2) GO TO 5800
C
```

```

C CANTILEVER MASS MATRIX MD IS CURRENTLY STORED IN VARIABLE A.      515
C FIRST. COMPUTE LAMBDA(TRAN)*MD . STORE RESULT IN ELMMD.      516
C CALL GEDLAB(BHVIBIFO09,IUDLT1,NAME,IFDLTI,KROW,KCOL)      517
DO 5405 I=1,KROW
CALL GETROW(IUDLT1,1,ELAM(1,I),KCOL)
5405 CONTINUE
CALL DCLOSE(IUDLT1)
C
DO 5420 I=1,LCOL
DO 5420 K=1,LROW
B=0.0
DO 5410 J=1,LROW
IF(K.LE.J) L=((J-1)*J/2)+K
IF(K.GT.J) L=((K-1)*K/2)+J
B=B+ELAM(J,I)*A(L)
5410 CONTINUE
ELMTMD(I,K)=B
5420 CONTINUE
C COMPUTE EMOM
C CALL GEDLAB(BHVIBIFO06,IUPATF,NAME,IFPATF,KROW,KCOL)
C
DO 5460 K=1,KROW
CALL GETROW(IUPATF,1,BUFFER,KCOL)
DO 5460 I=1,LCOL
B=0.0
DO 5440 J=1,LROW
B=B+ELMTMD(I,J)*BUFFER(J)
5440 CONTINUE
EMOM(I,K)=B
5460 CONTINUE
CALL DCLOSE(IUPATF)
C
DO 5480 I=1,LCOL
DO 5480 K=1,NROOTS
B=0.0
DO 5470 J=1,LCOL
B=B+EMP(I,J)*PHP(J,K)
5470 CONTINUE
EMOM(I,K)=EMOM(I,K)+B
5480 CONTINUE
C NOW. COMPUTE RMASS
C
DO 5540 I=1,LCOL
DO 5540 K=1,LCOL
B=0.0
DO 5520 J=1,LROW
B=B+ELMTMD(I,J)*ELAM(J,K)
5520 CONTINUE
RMASS(I,K)=B+EMP(I,K)
5540 CONTINUE
C
LEFT=LINES-KOUNT
IF(LEFT.LT.14) GO TO 5560
VIBIFO 515
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VIBIFO 570
VIBIFO 571

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```

      CALL PLB(1,4,ITAPEW)
      KOUNT=KOUNT+4
      GO TO 5570

  5560 KOUNT=LINES
  5570 CONTINUE
      CALL TITLES(2)
      WRITE(ITAPEW,3005) (J,J=1,LCOL)
      KOUNT=KOUNT+4
      DO 5580 I=1,LCOL
      CALL PLB(1,1,ITAPEW)
      WRITE(ITAPEW,2002) I,(RMASS(I,J),J=1,LCOL)
      KOUNT=KOUNT+2
  5580 CONTINUE

C   TRANSFER ALL GENERALIZED MASS TERMS (FLEX.+RIGID)
C   NORMALIZE SO THAT ALL DIAGONALS ARE UNITY.
C
      DO 5610 I=1,NROOTS
  5610 F(I)=SQRT((1.0/RMASS(I,I)))
      IF (KLUE(38).EQ.2) GO TO 5617
      DO 5615 I=1,LCOL
      F(NROOTS+I)=SQRT(1.0/RMASS(I,I))
  5617 CONTINUE

C
      DO 5620 I=1,NROOTS
  5620 CHK(I,J)=RMASS(I,J)*F(I)*F(J)
C
      IF (KLUE(38).EQ.2) GO TO 5645
      DO 5630 K=1,LCOL
      I=NROOTS+K
      DO 5630 J=1,NROOTS
      CHK(I,J)=EMOM(K,J)*F(I)*F(J)
  5630 CHK(J,I)=CHK(I,J)
C
      DO 5640 K=1,LCOL
      I=NROOTS+K
      DO 5640 L=1,LCOL
      J=NROOTS+L
      DO 5640 M=1,LCOL
      JCU=O
      CALL PLB(1,1,ITAPEW)
      NSIZ=NROOTS+L
      NLEFT = NTOTAL - NRIGID
      IF (KLUE(38).EQ.2) NSIZ = NROOTS
      JCU=O
      JCL=JCU+1
      JCU=JCU+KOLUMN
      IF (JCU.GT.NSIZ) JCU=NSIZ
      LEFT=_LINES-KOUNT
      IF (LEFT.LT.15) GO TO 5705
      CALL PLB(1,4,ITAPEW)
      WRITE(ITAPEW,3006) (NC,NC=JCL,JCU)
      CALL PLB(1,1,ITAPEW)
      KOUNT=KOUNT+4
  615
  620

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SUBROUTINE VIBIFO      74/74      OPT=1

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685      DO 735 NS=NSL,NSU          VIBFO   686
         NR = NS - NSL + 1        VIBFO   687
         A(NS) = A(NR)           VIBFO   688
    735  A(NR) = 0.0             VIBFO   689
         KR = NSL - 1           VIBFO   690
         KS = 0                 VIBFO   691
         DO 780 M=1,NROOTS      VIBFO   692
            IR = 0               VIBFO   693
            DO 740 I=1,IROWR      VIBFO   694
               BUFFER(I,I) = 0.0  VIBFO   695
            740  BUFFER(I,I) = 0.0 VIBFO   696
            DO 760 I=1,IROW      VIBFO   697
               KR = KR + 1       VIBFO   698
            DO 751 IJ=1,NDOFFF    VIBFO   699
               IF (IDFV(IJ).EQ.1) GOTO 752
            751  CONTINUE          VIBFO   700
            GOTO 760              VIBFO   701
            752 IR=IDFF(IJ)       VIBFO   702
               BUFFER(IR) = A(KR)
            760  CONTINUE          VIBFO   703
               CALL RWBT (ITAPE,BUFFER,IROWR)
            765  DO 770 IS=1,IROWR   VIBFO   704
               KS = KS + 1         VIBFO   705
            770 A(KS) = BUFFER(IS) VIBFO   706
            780  CONTINUE          VIBFO   707
               CALL FCLOSE (IDVIBA,JDVIBA,1)
            780  CONTINUE          VIBFO   708
            C
            C LIST MODE SHAPES EXCLUDING THE ELIMINATED DEGREES OF FREEDOM
            C
            715  IF (IROW.EQ.IROWR) GO TO 900
               KOUNT=LINES
               KCU = 0
               JCU = 0
               JCL = JCU + 1
               JCU = JCU + KOLUMN
               JCU = MINOF(JCU,NROOTS)
               INC = IROWR*(JCU-JCL)
               MIN = KCU + INC
               MAX = KCU + INC
               LEFT=LINES-KOUNT
               IF(LEFT.LT.15) GO TO 821
               CALL PLB (1,2,ITAPEW)
               WRITE(ITAPEW,4001) (J,J=JCL,JCU)
               CALL PLB (1,1,ITAPEW)
               KOUNT = KOUNT + 4
               GO TO 822
            821 KOUNT=LINES
            822  CONTINUE
            735  DO 850 I=1,IROWR      VIBFO   734
               CALL TITLES (2)        VIBFO   735
               IF (I .GT. 1 .OR. JCL .GT. 1) GO TO 825
               NROWS = 1               VIBFO   736
               KTABLE = 2              VIBFO   737
               CALL PTABLE (2,42,42)
               1 HMODE SHAPES FOR REDUCED DEGREES OF FREEDOM
            825  CONTINUE

```



```

1 C457OO, SUB COMPAK
C
C*** SUBROUTINE *****
C
C*** COMPUTER VERSION *****
C
C IBM ... AS IS
C
C*** CDC ... AS IS
C
C*** OBJECTIVE *****
C
C READ, AND LIST ON AN OPTIONAL BASIS, THE STIFFNESS OR
C FLEXIBILITY MATRIX.
C
C FORTRAN PROGRAM TO READ STIFFNESS OR FLEXIBILITY MATRIX
C
C
C*** INPUT/OUTPUT *****
C
C*** SUMMARY OF SYMBOLS *****
C
C*** ERROR MESSAGES *****
C
C NONE.
C
C*** SUBROUTINE COMPAK (IROW,IRWDD)
C
C DIMENSION HEAD(5,5),HOLD(5)
C
C DIMENSION ISETUP(45),IPOS(20),ITAPES(50),KLUEV(20)
C
C DIMENSION LCOL(5)
C
C DIMENSION MATNAME(2)
C
C DIMENSION ROW(220),SFMAT(25000)
C
C DIMENSION TSHV(1)
C
C COMMON/PLACES/ IUN1,IUN2,IUOUT1,IUOUT2,IUGO1,IUGO2,IUGO3,IUGO4,
C
C 1 IUSCR,IFSCR,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR,
C
C 2 IUA,IFU,IFV,IFY,IUMEMN,IUMEMN,IUSTFN,IUSTFN,
C
C 3 IUKS,IFKS,IUB,IFB,IUDESO,IFDESO,
C
C 4 IUMDBI,IFMDBI,IUADD,IUADD,IUBALI,IFBALI,
C
C 5 IUDESI,IUDESI,IUWTI,IUWTI,
C
C 6 IUMEMO,IUMEMO,IUBT,IFBT,
C
C 7 IUDESN,IUDESN,IUMD,IFMD,
C
C 8 IUMEMF,IUMEMF,
C
C 9 IUSTFO,IUSTFO,IUMDB,IFMDB,IUADD,IUADD,IUBAL,IFBAL,
C
C A IUDESF,IUDESF,IUWT,IUWT,
C
C B IUDUM1,IUDUM1,IUDUM2,IUDUM2,IUDUM3,IUDUM3,
C
C C IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IFZR,IULR,IFLR,
C
C D IUBR,IFBR,
C
C E IUPHTF,IUPHTF,IUMODM,IUMODM,
C
C F IUMODK,IUMODK,IUPHT,IUPHT,IUQT,IUQT,IUQ,IUQ,
C
C G IUPH,IUPH,IUINCM,IUINCM,IUINCK,IUINCK

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SUBROUTINE VIBIF0

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COMMON BLOCKS LENGTH

MEMBERS - BIAS NAME(LENGTH)

69	IFL	(1)
72	IUZ	(1)
75	IFZR	(1)
78	IUBR	(1)
81	IPHTF	(1)
84	IUMODK	(1)
87	IFPHT	(1)
90	IUQ	(1)
93	IFPH	(1)
96	IUINCK	(1)
97	IUINCK	(1)
98	EMP	(9)
99	IUMOFF	(1)
100	IFOLI	(1)
101	IUMPLI	(1)
102	IFTPGT	(1)
103	IUMPL	(1)
104	IFSLT	(1)
105	IUDLT	(1)
106	IUQA	(1)
107	IFQAT	(1)
108	IUPHAT	(1)
109	KFREE	(1)
110	NRDTS	(1)
111	IDFV	(220)
112	LKLU	(1)
113	RIGFRQ	(3)

MEMBERS - BIAS NAME(LENGTH)

O	ELAM	(660)
O	CHK	(1849)

## STATISTICS

PROGRAM LENGTH

CM LABELED COMMON LENGTH  
52000B CM USED

150018 6657

62370B 25848

1B49 ELMTMD (660)

SUBROUTINE	VIBINFO	74/74	OPT:-1	LENGTH	PROPERTIES	FTN 4 8+577
LOOPS	LABEL	INDEX	FROM-TO			
2010		1	660 660	11B	EXT REFS	
2027	790	1	666 673	21B	EXT REFS	NOT INNER
2042	795	K1	670 672	3B	INSTACK	
2057		IE	679 679	10B	INSTACK	EXT REFS
2100	735	NS	685 688	4B	INSTACK	EXT REFS
2110	780	M	691 708	43B	INSTACK	EXT REFS
2114	740	II	693 694	2B	INSTACK	NOT INNER
2120	760	I	695 703	17B	INSTACK	NOT INNER
2122	751	IJ	697 699	5B	INSTACK	EXITS
2144	770	IS	705 707	3B	INSTACK	
2202		J	728 728	4B	INSTACK	EXT REFS
2216	850	I	734 761	110B	EXT REFS	
2241		J	745 745	4B	EXT REFS	
2260	842	IJ	752 755	6B	INSTACK	EXITS
2276		K	758 758	7B	INSTACK	EXT REFS
2313		K	760 760	7B	INSTACK	EXT REFS
COMMON	BLOCKS	LENGTH	MEMBERS - BIAS NAME (LENGTH)			
	CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)	
			3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)	
			6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)	
			9 KOUNTH (1)	10 KOUNTI (1)		
			0 KTABLE (1)	1 NPASS (1)	2 ROWS (1)	
			3 NOCLS (1)	4 NCOLST (1)	5 KTABLO (1)	
			6 NPAGEA (1)	7 ITAPET (1)		
			0 LTSHV (1)	1 TSHV (1)		
			0 ITAPES (1)			
			0 LTITLE (1)	1 TITLE (36)		
			0 IPOTS (1)			
			0 KFILES (1)	1 IFILES (1)		
			0 FREQ (1)			
			0 A (25000)			
			0 ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)	
			0 KREPOR (1)			
			0 IUIN1 (1)	1 IUIN2 (1)	2 IUDOUT1 (1)	
			3 IUDOUT2 (1)	4 IUGO1 (1)	5 IUGO2 (1)	
			6 IUGO3 (1)	7 IUGO4 (1)	8 IUSCR (1)	
			9 IFSCR (1)	10 IFS1 (1)	11 IFS2 (1)	
			12 IFS3 (1)	13 IFS4 (1)	14 IUCD (1)	
			15 IUPR (1)	16 IUA (1)	17 IFA (1)	
			18 IUY (1)	19 IFY (1)	20 IUMEMN (1)	
			21 IFMEMN (1)	22 IUSTFN (1)	23 IFSTFN (1)	
			24 IUKS (1)	25 IFKS (1)	26 IUB (1)	
			27 IFB (1)	28 IUDSO (1)	29 IFDESO (1)	
			30 IUMDBI (1)	31 IFMDBI (1)	32 IUADDI (1)	
			33 IFADDI (1)	34 IUBALI (1)	35 IFBALI (1)	
			36 IUDESI (1)	37 IFDES1 (1)	38 IUWT1 (1)	
			39 IFWTI (1)	40 IUMEMO (1)	41 IFMEMO (1)	
			42 IUBT (1)	43 IFBT (1)	44 IUDESN (1)	
			45 IFDESN (1)	46 IUND (1)	47 IFMD (1)	
			48 IUMEMF (1)	49 IFMEMF (1)	50 IUSTFO (1)	
			51 IFSTFO (1)	52 IUMDB (1)	53 IFMDB (1)	
			54 IUADD (1)	55 IFADD (1)	56 IUBAL (1)	
			57 IFBAL (1)	58 IUDESF (1)	59 IFDESF (1)	
			60 IUWT (1)	61 IFWT (1)	62 IUDUM1 (1)	
			63 IFDUM1 (1)	64 IUDUM2 (1)	65 IFDUM2 (1)	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
	422	5215	K	264 267	4B INSTACK
	443	5230	I	275 279	5B INSTACK NOT INNER
	452	5240	N	284 291	INSTACK
	464	5235	J	287 290	4B
	512	320	I	307 311	10B EXT REFS
	551	5325	K	330 330	4B EXT REFS
	563	5325	I	333 336	22B EXT REFS
	567	5325	K	334 334	11B EXT REFS
	632	500	I	356 379	63B EXT REFS
	661	661	J	371 371	4B EXT REFS
	702	702	K	378 378	7B EXT REFS
	725	43	I	389 397	25B EXT REFS
	743	110	K	394 396	4B INSTACK EXT REFS
	756	45	I	405 430	71B EXT REFS
	761	46	I	407 409	6B EXT REFS
	770	47	J	410 420	30B EXT REFS
	775	48	K	411 417	13B OPT
	1021	53	I	421 428	22B EXT REFS
	1051	5370	I	437 445	37B EXT REFS
	1052	5370	L	438 445	33B EXT REFS
	1054	5360	K	440 443	23B EXT REFS
	1067	5360	J	441 443	4B INSTACK
	1114	630	I	452 454	3B INSTACK
	1131	620	I	462 464	4B INSTACK
	1164	NC	NC	483 483	4B INSTACK
	1200	700	MR	489 502	57B EXT REFS
	1224	NC	NC	496 496	4B EXT REFS
	1242	NC	NC	501 501	11B EXT REFS
	1266	5405	I	518 520	7B EXT REFS
	1277	5420	I	523 532	40B NOT INNER
	1300	5420	K	524 532	34B NOT INNER
	1311	5410	K	526 530	15B OPT
	1341	5460	K	538 546	26B EXT REFS
	1344	5460	I	540 546	20B EXT REFS
	1352	5440	I	542 544	4B INSTACK
	1371	5480	I	549 556	30B NOT INNER
	1372	5480	K	550 556	24B NOT INNER
	1403	5470	J	552 554	4B INSTACK
	1422	5540	I	560 567	30B NOT INNER
	1423	5540	K	561 567	24B NOT INNER
	1434	5520	J	563 565	4B INSTACK
	1467	5580	I	577 577	4B EXT REFS
	1477	5580	I	579 583	23B EXT REFS
	1504	5610	I	581 581	11B EXT REFS
	1523	5615	I	588 589	10B EXT REFS
	1536	5615	I	591 592	7B EXT REFS
	1546	5620	J	595 597	20B NOT INNER
	1556	5620	J	596 597	4B INSTACK
	1571	5630	K	600 604	24B NOT INNER
	1605	5630	J	602 604	5B INSTACK
	1616	5640	K	606 610	25B NOT INNER
	1632	5640	L	608 610	5B INSTACK
	1672	NC	NC	625 625	4B EXT REFS
	1706	5750	I	631 643	55B EXT REFS
	1730	NC	NC	637 637	4B EXT REFS
	1745	790	J	641 641	11B FXT REFS
	2005	790	M	659 660	70R NNT INNFR

SUBROUTINE	VIBIFO	74/74	OPT=1
STATEMENT	LABELS	DEF LINE	REFERENCES
545	5320	329	326
0	5325	336	333
614	5330	342	337
614	5340	344	318
0	5360	443	440
0	5370	445	437
1110	5400	447	435
0	5405	520	518
0	5410	530	526
0	5420	532	523
0	5440	544	542
0	5460	546	538
0	5470	554	552
0	5480	556	549
0	5520	565	563
0	5540	567	560
1460	5560	574	570
1462	5570	575	573
0	5580	583	579
0	5610	589	588
0	5615	592	591
1545	5617	593	590
0	5620	597	595
0	5630	604	600
0	5640	610	606
1643	5645	611	599
1653	5700	619	644
1703	5705	629	623
1705	5710	630	628
1741	5715	640	633
0	5750	643	631
1766	5800	646	512

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS	NOT INNER
23	60	I	94 107	43B	QPT		
41	230	J	98 104	12B	INSTACK		
60	83	J	105 106	3B			
			125 127	7B			
	76	K	133 141	30B	EXT REFS		
112	5000	I	134 141	24B	NOT INNER		
113	5020	K	137 139	4B	NOT INNER		
125	5010	J	148 150	7B	INSTACK		
151	5030	I	169 174	13B	EXT REFS		
201	5044	N	170 172	2B	INSTACK		
204	5042	I	177 227	117B	EXT REFS		
215	5200	K	182 185	4B	INSTACK		
223	5050	I	190 197	24B	INSTACK		
231	5070	I	192 194	4B	INSTACK		
242	5060	J	204 207	6B	INSTACK		
262	5080	I	209 211	5B	INSTACK		
277	5090	I	213 217	4B	INSTACK		
312	5100	I	219 221	3B	INSTACK		
324	5110	I	239 246	22B	NOT INNER		
342	5210	N	243 245	2B	INSTACK		
357	5205	L	253 256	5B	INSTACK		
376	5211	N	259 261	3B	INSTACK		
410	5213	N	263 268	15B	NOT INNER		
415	5220						

STATEMENT LABELS	74/74	DEF LINE	REFERENCES
2252 840	748	742	
0 842	755	752	
2267 844	757	754	
2307 846	760	757	
2323 850	761	734	759
2330 900	763	715	
3106 1000	770	679	
3110 1001	771	252	
3112 2000	772	369	
3133 2001	775	371	
3140 2002	776	334	378
3143 3000	777	492	
3147 3001	778	483	496
3153 3002	779	501	
3156 3003	780	493	
3171 3004	782	494	
3200 3005	783	577	
3217 3006	787	625	
3222 3007	788	634	
3255 3008	794	641	
3260 3009	795	635	
3313 4000	801	743	
3325 4001	803	728	
3333 4002	804	758	
3336 4003	805	760	
3341 4004	806	327	
3347 4005	807	330	
0 5000	127	125	
0 5010	139	137	
0 5020	141	133	134
0 5030	150	148	
172 5040	161	158	
0 5042	172	170	
0 5044	174	169	
214 5046	175	168	
0 5050	185	182	
0 5060	194	192	
0 5070	197	190	
0 5080	207	204	
0 5090	211	209	
0 5100	217	213	
0 5110	221	219	
0 5200	227	177	
0 5205	245	243	
0 5210	246	239	
0 5211	256	253	
405 5212	258	251	
0 5213	261	259	
0 5200	262	257	
414 5214	267	264	
0 5215	267		
0 5220	268	263	
0 5230	279	275	
0 5235	290	287	
0 5240	291	284	
0 5300	295	110	233
475 5310	304	301	
527	271	210	

SUBROUTINE VIBIFO		74/74		OPT=x1				FTN 4.8+577		85/01/23 08.10.44		PAGE
EXTERNALS	TYPE	ARGS		REFERENCES				456	467		22	
PUTROW		4		173		225						
RITVEC		4		310								
RWBT		3		658		704						
SCAPRO	REAL	6		419		426						
SQRT	REAL	1	LIBRARY	589		592						
TITLES		1		325		357						
INLINE FUNCTIONS	TYPE	ARGS		INTRIN	DEF LINE	REFERENCES						
ABS	REAL	1	SF	70	2*103	2*206						
ABSF	REAL	1	SF	69	2*103	2*206						
MAXOF	INTEGER	2										
MINO	INTEGER	0	INTRIN	350		479						
MINOF	INTEGER	2	SF	350		479						
STATEMENT LABELS			DEF LINE		REFERENCES							
0 43			397		389							
0 45			430		405							
0 46			409		407							
0 47			420		410							
0 48			417		411							
1002 49			415		412							
1005 52			416		414							
1040 53			428		421							
1027 54			425		423							
0 60			107		94							
46 82			103		101							
0 83			106		105							
0 110			396		394							
0 230			104		98							
0 320			311		307							
616 400			348		380							
647 405			367		358							
672 410			374		368							
0 500			379		356							
1146 600			477		503							
1175 602			487		481							
1177 605			488		486							
1235 610			499		491							
0 620			464		462							
0 630			454		452							
0 700			502		489							
0 720			660		659							
2070 734			680		678							
0 735			707		705							
0 740			708		691							
0 790			694		693							
0 795			673		666							
0 800			672		670							
2161 820			710									
2213 821			719		762							
2215 822			732		726							
...			733		731							

SUBROUTINE VIBIFO		74/74 OPT=1		FTN 4.8+577		85/01/23 . 08 . 10 . 44		PAGE 21
VARIABLES	SN	TYPE	RELOCATION F.P.					
O	NCYC	INTEGER						
3421	NDOF	INTEGER						
1	NDOFFF	INTEGER						
3370	NFLIL	INTEGER						
3454	NFLEX	INTEGER						
2651	NONE	INTEGER						
6	NPAGE	INTEGER						
6	NPAGEA	INTEGER						
1	NPASS	INTEGER						
3473	NR	INTEGER						
3367	NRIGID	INTEGER						
O	NROOTS	INTEGER	VKLU E					
3403	NROW	INTEGER						
2	NRROWS	INTEGER						
3472	NS	INTEGER						
3453	NS12	INTEGER						
3470	NSL	INTEGER						
3471	NSU	INTEGER						
3366	NTOTAL	INTEGER						
2	NZERO	INTEGER						
11	PHP	REAL	ARRAY					
3502	Q	REAL	ARRAY					
10426	QMASS	REAL	ARRAY					
13526	QQ	REAL	ARRAY					
0	RIGFRQ	REAL	ARRAY					
14252	RMASS	REAL	ARRAY					
3450	SUM	REAL	ARRAY					
1	TITLE	REAL	CTITLE					
3502	TPLUG	REAL	ARRAY					
1	TSHV	REAL	ARRAY					
3400	XLARGE	REAL						
3415	XMAX	REAL						
VARIABLES USED AS FILE NAMES. SEE ABOVE								
EXTERNALS	TYPE	ARGS	REFERENCES					
DCLOSE	1	108	128	151	228	312	398	429
FCLOSE	3	521	547	674				457
FSIO	6	709						
GEDLAB	6	653						
GETROW	4	93						
PLB	3	97						
PROGNA	2	331						
PTABLE	3	624						
PUDLAB	6	631						

SUBROUTINE	VIBIFO	74/74	OPT=1	RELOCATION	FTN 4 8+577	85/01/23 . 08.10.44	PAGE	20
VARIABLES	SN	TYPE						
11	KOUNTH	INTEGER		CLIST	487	498	572	582
12	KOUNTI	INTEGER		CLIST	627	629	642	732
1	KPAGE	INTEGER		CLIST	751	326	716	732
3474	KR	INTEGER		REPORT	REFS	17	491	633
0	KREPOR	INTEGER			REFS	17		742
3401	KROW	INTEGER			REFS	696	702	
3475	KS	INTEGER			REFS	29	79	
0	KTABLE	INTEGER			REFS	124	125	
5	KTABLEO	INTEGER			REFS	517	518	
3432	KTOP	INTEGER			REFS	536	538	
5	KTPAGE	INTEGER			REFS	706	707	
3465	K1	INTEGER			REFS	19	147	
3420	L	INTEGER			REFS	19	147	
3411	LCOL	INTEGER			REFS	322	323	
					REFS	320	324	
					REFS	17		
					REFS	2*671		
					REFS	2*244		
					REFS	442	2*444	
					REFS	438	527	
					REFS	192	209	
					REFS	549	552	
					REFS	540	600	
					REFS	591	606	
					REFS	608	608	
					REFS	154		
					REFS	339	481	
					REFS	338	480	
					REFS	17	569	
					REFS	487	569	
					REFS	732	574	
					REFS	17		
					REFS	17		
					REFS	17		
					REFS	54		
					REFS	653		
					REFS	163		
					REFS	213		
					REFS	225		
					REFS	524		
					REFS	153		
					CTITLE	23		
					CTSHV	21		
					REFS	660		
					REFS	376	750	
					REFS	375	749	
					REFS	683	684	
					REFS	2*501	489	
					REFS	240	241	
					REFS	2*266	285	
					REFS	253	263	
					REFS	274	275	
					REFS	2	93	
					REFS	13	455	
					REFS	13	466	
					REFS	2	163	
					REFS	276	274	
					REFS	483	496	
					REFS	483	501	
					REFS	496	501	
					REFS	135	137	
					REFS	19	355	
					REFS	19		
3422	NAFLEX	INTEGER	ARRAY					
10420	NAME	INTEGER	ARRAY					
34672	NAME1	INTEGER	ARRAY					
14674	NAME2	INTEGER	ARRAY					
10422	NAME3	INTEGER	ARRAY					
3423	NA10TL	INTEGER						
3451	NC	INTEGER						
3404	NCOL	INTEGER						
3	NCOLS	INTEGER						
4	NCOLST	INTEGER						

SUBROUTINE VIBIFO 74 / 74 OPT = 1

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VARIABLES	SN	TYPE	RELOCATION PLACES
IUYT	106	INTEGER	PLACES
IUZ	110	INTEGER	PLACES
IUZR	112	INTEGER	PLACES
I	3446	INTEGER	*
J	3376	INTEGER	

3377	JB	INTEGER
3430	JCL	INTEGER
3444	JCOL	* INTEGER
3372	JOLS	INTEGER
3431	JCU	INTEGER

DEFINED	99	43	496	50
351	358	371	483	

3456	JDVIBA
3424	JL
3406	JO
3425	JU
3405	K

121 709

```

      KB      INTEGER
      KBOT    INTEGER
      KBPAGE  INTEGER
      KCL     INTEGER
      KCOL    INTEGER
      KCU     INTEGER

```

606      758      760

	1	KLUE	INTEGER	ARRAY	CLUEM
0	KLUSE	INTEGER	INTEGER	F.P.	
3365	KOLUMN	INTEGER	INTEGER	CLIST	
0	KOUNT	INTEGER	INTEGER		

158	168	233	590	599
				617

ROUTINE	VARIABLE	SN	TYPE	RELOCATION	FTN 4.8+577	85/01/23. 08, 10, 44	PAGE	18
SUBROUTINE	VARIABLE	SN	TYPE	RELOCATION			PAGE	
	VIBINFO	74/74	OPT=1					
	VARIABLES							
	52	IUBT	INTEGER	PLACES	REFS	30		
	16	IUCD	INTEGER	PLACES	REFS	306	310	
	3426	IUCOM	INTEGER	PLACES	REFS	665	674	DEFINED
	72	IUDESF	INTEGER	PLACES	REFS	30	406	424
	44	IUDESI	INTEGER	PLACES	REFS	30	302	429
	54	IUDESN	INTEGER	PLACES	REFS	30		
	34	IUDESO	INTEGER	PLACES	REFS	30		
	20	IUDLT	INTEGER	PLAYFF	REFS	48		
	2	IUDLT1	INTEGER	PLAYFF	REFS	48		
	76	IUDUM1	INTEGER	PLAYFF	REFS	48		
	100	IUDUM2	INTEGER	PLAYFF	REFS	48		
	102	IUDUM3	INTEGER	PLAYFF	REFS	48		
	4	IUGO1	INTEGER	PLAYFF	REFS	48		
	5	IUGO2	INTEGER	PLAYFF	REFS	48		
	6	IUGO3	INTEGER	PLAYFF	REFS	48		
	7	IUGO4	INTEGER	PLAYFF	REFS	48		
	140	IUINCK	INTEGER	PLAYFF	REFS	48		
	136	IUINCM	INTEGER	PLAYFF	REFS	48		
	0	IUIN1	INTEGER	PLAYFF	REFS	48		
	1	IUIN2	INTEGER	PLAYFF	REFS	48		
	30	IUKS	INTEGER	PLAYFF	REFS	48		
	104	IUL	INTEGER	PLAYFF	REFS	48		
	114	IULR	INTEGER	PLAYFF	REFS	48		
	56	IUMD	INTEGER	PLAYFF	REFS	48		
	64	IUMDB	INTEGER	PLAYFF	REFS	48		
	36	IUMDBI	INTEGER	PLAYFF	REFS	48		
	0	IUMOFF	INTEGER	PLAYFF	REFS	48		
	60	IUMEMF	INTEGER	PLAYFF	REFS	48		
	24	IUMEMN	INTEGER	PLAYFF	REFS	48		
	50	IUMEMO	INTEGER	PLAYFF	REFS	48		
	124	IUMODK	INTEGER	PLAYFF	REFS	48		
	122	IUMODM	INTEGER	PLAYFF	REFS	48		
	14	IUMPL	INTEGER	PLAYFF	REFS	48		
	6	IUMPL1	INTEGER	PLAYFF	REFS	48		
	2	IUDUT1	INTEGER	PLAYFF	REFS	48		
	3	IUDUT2	INTEGER	PLAYFF	REFS	48		
	12	IUPATF	INTEGER	PLAYFF	REFS	48		
	134	IUPH	INTEGER	PLAYFF	REFS	48		
	26	IUPHA	INTEGER	PLAYFF	REFS	48		
	30	IUPHAT	INTEGER	PLAYFF	REFS	48		
	126	IUPHT	INTEGER	PLAYFF	REFS	48		
	120	IUPHTF	INTEGER	PLAYFF	REFS	48		
	17	IUPR	INTEGER	PLAYFF	REFS	48		
	132	IUO	INTEGER	PLAYFF	REFS	48		
	22	IUOA	INTEGER	PLAYFF	REFS	48		
	24	IUQAT	INTEGER	PLAYFF	REFS	48		
	130	IUQT	INTEGER	PLAYFF	REFS	48		
	10	IUSCR	INTEGER	PLAYFF	REFS	48		
	16	IUSLT	INTEGER	PLAYFF	REFS	48		
	4	IUSLT1	INTEGER	PLAYFF	REFS	48		
	26	IUSTFN	INTEGER	PLAYFF	REFS	48		
	62	IUSTFO	INTEGER	PLAYFF	REFS	48		
	10	IUTPGT	INTEGER	PLAYFF	REFS	48		
	74	IUWT	INTEGER	PLAYFF	REFS	48		
	46	IUWT1	INTEGER	PLAYFF	REFS	48		
	27	IIV	INTEGER	PLAYFF	REFS	48		

SUBROUTINE	VIBIF0	74/74	OPT = 1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	17
VARIABLES				RELOCATION				
5	IFSLTI	INTEGER		PLAYFF				
27	IFSTFN	INTEGER		PLACES	REFS	30		
63	IFSTF0	INTEGER		PLACES	REFS	30		
12	IFS1	INTEGER		PLACES	REFS	30		
13	IFS2	INTEGER		PLACES	REFS	30		
14	IFS3	INTEGER		PLACES	REFS	30		
15	IFS4	INTEGER		PLACES	REFS	30		
11	IFTP GT	INTEGER		PLAYFF	REFS	48	124	
75	IFWT	INTEGER		PLACES	REFS	30		
47	IFWTI	INTEGER		PLACES	REFS	30		
23	IFY	INTEGER		PLACES	REFS	30		
107	IFYT	INTEGER		PLACES	REFS	30		
111	IFZ	INTEGER		PLACES	REFS	30		
113	IFZR	INTEGER		PLACES	REFS	30		
3414	II	INTEGER		REFS	184	2*196	2*215	423
				2*427	694	183	195	426
					693	701	753	421
						758	753	
						670	756	
						394	96	
						391	668	
						353	668	
						724	722	
						242	240	
						195	214	
						205	276	
						244	178	
						278	241	
						92	277	
						387	386	
						351	351	
						701	309	
						97	411	
						306	419	
						408	715	
						669	695	
						668	668	
						667	667	
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SUBROUTINE VIBIFO		74/74	OPT = 1	RELOCATION	74/74	OPT = 1	RELOCATION	74/74	OPT = 1	RELOCATION	74/74	OPT = 1	RELOCATION
VARIABLES	SN	TYPE			VARIABLES	SN	TYPE			VARIABLES	SN	TYPE	
3464 IANS1		INTEGER			3442 IANS6		INTEGER			3374 IANS5		INTEGER	
3447 IANS2		INTEGER			337 IDFF		INTEGER			3374 IANS5		INTEGER	
3447 IANS5		INTEGER			337 IDFF		INTEGER			3442 IANS6		INTEGER	
3447 IANS5		INTEGER			3 IDFV		INTEGER			3 IDFV		INTEGER	
3455 IDVIBA					3 IDFV		INTEGER			3455 IDVIBA		INTEGER	
3466 IE					3466 IE		INTEGER			3466 IE		INTEGER	
21 IFA					21 IFA		INTEGER			21 IFA		INTEGER	
67 IFADD					67 IFADD		INTEGER			67 IFADD		INTEGER	
41 IFADDI					41 IFADDI		INTEGER			41 IFADDI		INTEGER	
33 IFB					33 IFB		INTEGER			33 IFB		INTEGER	
71 IFBAL					71 IFBAL		INTEGER			71 IFBAL		INTEGER	
43 IFBALI					43 IFBALI		INTEGER			43 IFBALI		INTEGER	
117 IFBR					117 IFBR		INTEGER			117 IFBR		INTEGER	
53 IFBT					53 IFBT		INTEGER			53 IFBT		INTEGER	
3427 IFCOM					3427 IFCOM		INTEGER			3427 IFCOM		INTEGER	
73 IFDESI					73 IFDESI		INTEGER			73 IFDESI		INTEGER	
45 IFDES1					45 IFDES1		INTEGER			45 IFDES1		INTEGER	
55 IFDESN					55 IFDESN		INTEGER			55 IFDESN		INTEGER	
35 IFDESO					35 IFDESO		INTEGER			35 IFDESO		INTEGER	
21 IFDLT					21 IFDLT		INTEGER			21 IFDLT		INTEGER	
3 IFDLTI					3 IFDLTI		INTEGER			3 IFDLTI		INTEGER	
77 IFDUM1					77 IFDUM1		INTEGER			77 IFDUM1		INTEGER	
101 IFDUM2					101 IFDUM2		INTEGER			101 IFDUM2		INTEGER	
103 IFDUM3					103 IFDUM3		INTEGER			103 IFDUM3		INTEGER	
1 IFILES					1 IFILES		INTEGER			1 IFILES		INTEGER	
141 IFINCK					141 IFINCK		INTEGER			141 IFINCK		INTEGER	
137 IFINCM					137 IFINCM		INTEGER			137 IFINCM		INTEGER	
31 IFKS					31 IFKS		INTEGER			31 IFKS		INTEGER	
105 IFL					105 IFL		INTEGER			105 IFL		INTEGER	
115 IFLR					115 IFLR		INTEGER			115 IFLR		INTEGER	
57 IFMD					57 IFMD		INTEGER			57 IFMD		INTEGER	
65 IFMDB					65 IFMDB		INTEGER			65 IFMDB		INTEGER	
37 IFMDBI					37 IFMDBI		INTEGER			37 IFMDBI		INTEGER	
1 IFMDF					1 IFMDF		INTEGER			1 IFMDF		INTEGER	
61 IFMEMF					61 IFMEMF		INTEGER			61 IFMEMF		INTEGER	
25 IFMEMN					25 IFMEMN		INTEGER			25 IFMEMN		INTEGER	
51 IFMEMO					51 IFMEMO		INTEGER			51 IFMEMO		INTEGER	
125 IFMODK					125 IFMODK		INTEGER			125 IFMODK		INTEGER	
123 IFMODM					123 IFMODM		INTEGER			123 IFMODM		INTEGER	
15 IFMPL					15 IFMPL		INTEGER			15 IFMPL		INTEGER	
7 IFMPLI					7 IFMPLI		INTEGER			7 IFMPLI		INTEGER	
13 IFPATF					13 IFPATF		INTEGER			13 IFPATF		INTEGER	
135 IFPH					135 IFPH		INTEGER			135 IFPH		INTEGER	
27 IFPHA					27 IFPHA		INTEGER			27 IFPHA		INTEGER	
3 IFPHAT					3 IFPHAT		INTEGER			3 IFPHAT		INTEGER	
127 IFPHT					127 IFPHT		INTEGER			127 IFPHT		INTEGER	
121 IFPTF					121 IFPTF		INTEGER			121 IFPTF		INTEGER	
133 IFO					133 IFO		INTEGER			133 IFO		INTEGER	
23 IFQA					23 IFQA		INTEGER			23 IFQA		INTEGER	
25 IFQAT					25 IFQAT		INTEGER			25 IFQAT		INTEGER	
131 IFSCR					131 IFSCR		INTEGER			131 IFSCR		INTEGER	
11 IFSLT					11 IFSLT		INTEGER			11 IFSLT		INTEGER	
17 IFSLT					17 IFSLT		INTEGER			17 IFSLT		INTEGER	

SUBROUTINE	VIBIFO	74/74	OPT=1	FTN 4.8+577	85/01/23 .	OB . 10 . 44
4	/ ,10X ,9HTHE LAST ,12 ,31H ROWS/COLS ARE ASSOCIATED WITH ,			VIBIFO	800	
5	19HTHE FLEXIBLE MODES.)			VIBIFO	801	
4000	FORMAT (10X,55HNORMALIZED EIGEN VECTORS FOR REDUCED DEGREES OF FRE			VIBIFO	802	
1EDOM,3X,17H(ABSOLUTE MOTION))				VIBIFO	803	
4001	FORMAT (10X , 1X,4HINEW , 1X , 4HIOLD , 3X , 3HM = , 6X,12 , 7(12X,112))			VIBIFO	804	
4002	FORMAT (10X , 15 , 15 , 1P8E14 , 6)			VIBIFO	805	
4003	FORMAT (10X , 15 , A5 , 1P8E14 , 6)			VIBIFO	806	
4004	FORMAT (/ ,10X , 32HMODAL DISPLACEMENTS OF PLUG MASS , /)			VIBIFO	807	
4005	FORMAT (//10X,5H DOF,8(10X,14))			VIBIFO	808	
C	RETURN			VIBIFO	809	
	END			VIBIFO	810	

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	VIRUS	DEF LINE	REFERENCES
2	2	2	2

SUBROUTINE COMPAK 74/74 OPT=1

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COMMON/KLUES/ KLUSE, KLUNAL, IRED, KLUND, KLUBAL, MSADD, NPAS, IDNOPT, COMPAK
1 VDES, EPS1, DMAX, NBAR, NFIX, D, DEL, EPS2, NCYC, NNN, IBAND, COMPAK
2 IFIN, KLUB, KLUQ, MORBAL, DBAL, COMPAK
COMMON /CLIST / KOUNT, KPAGE, LINES, LINEST, KLABEL, KTPAGE, NPAGE COMPAK
1 KTPAGE, LINESG, KOUNTH, KOUNTI COMPAK
COMMON /CTABLE/ KTABLE, NPASS, NROWS, NCOLS, NCOLST, KTABLO, NPAGEA COMPAK
1 ITAPET COMPAK
COMMON /CTSHV / LTSHV, TSHV COMPAK
COMMON /CLUEV / LKLUEV, KLUEV COMPAK
COMMON /CPMASS/ SFMAT COMPAK
COMMON /CTAPES/ ITAPES COMPAK
COMMON /COMRWP/ ITAPER, ITAPEW, ITAPEP COMPAK
COMMON /MATRIX/ ISETUP COMPAK
COMMON /REPORT/ KREPOR COMPAK
COMMON /FILE / IPPOS COMPAK
C C
C FUNCTION DEFINITION
C MINOF(11,12) = MINO(11,12)
C
C INITIAL CONDITIONS
DATA HOLD/ 4HROW ,4H COL,4H ,4H V,4HALUE/
DO 5 IH=1,5 COMPAK
DO 5 JH=1,5 COMPAK
5 HEAD(IH,JH) = HOLD(IH) COMPAK
ZERO = O.O COMPAK
NMATD = (IROWD*(IROWD+1))/2 COMPAK
CALL DVALUE (ROW,ZERO,IROWD) COMPAK
CALL DVALUE (SFMAT,ZERO,NMATD) COMPAK
ITAPEW = ITAPES(6) COMPAK
M = O COMPAK
KMATV = 1 COMPAK
IF (IRED.EQ.1) KMATV = 2 COMPAK
KLISTV=KLUEV(3) COMPAK
KOUNT = LINES COMPAK
CALL PROGNA (4H(COM, 4HPAK)) COMPAK
90 GO TO ( 10, 12 ), KMATV COMPAK
10 NTAPE = IUKS COMPAK
IFILE = IFKS COMPAK
KOLUMN = 5 COMPAK
IF (KREPOR .EQ. 2) KOLUMN = 3 COMPAK
100 IF (KREPOR .EQ. 2) KOLUMN = 4 COMPAK
GO TO 14 COMPAK
12 NTAPE = IUA COMPAK
IFILE = IFA COMPAK
KOLUMN = 8 COMPAK
IF (KREPOR .EQ. 2) KOLUMN = 4 COMPAK
105 14 CONTINUE COMPAK
C
C READ STIFFNESS OR FLEXIBILITY MATRIX
CALL TITLES (2) COMPAK
106 IFILE = 1 COMPAK
IPOS(NTAPE) = IFILE COMPAK
CALL GENAR (CHICOND, NTADE, MATNAM, TFTIF, TDNU, NM) COMPAK
107
110
111
112
113
114
115
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115      DO 100 J=1,IROW
          CALL GETROW (NTAPE, 1, ROW , NM)
          DO 20 L=1,J
              M = M + 1
              SFMAT(M) = ROW(L)
20      CONTINUE
100     CONTINUE
          CALL DCLOSE (NTAPE)
C
C      C LIST STIFFNESS OR FLEXIBILITY MATRIX
C      IF (KLISTV .EQ. 1) GO TO 195
        NROWS = 1
        NCOLS = 3
        KTABLE = 2
        IF (KMATV .EQ. 2) GO TO 92
          LOC = 0
          IROWS = IROW
          DO 90 I=1,IROWS
              J = 0
              JCOLS = 1
              KOL = KOL + 1
              LOC = LOC + 1
              J = J + 1
              IF (J .GE. JCOLS) GO TO 60
              IF (SFMAT(LOC) .NE. 0)
                  IF (J .EQ. JCOLS) GO TO 55
                  IF (KOL .LT. KOLUMN) GO TO 65
                  IF (KOL .EQ. KOLUMN) GO TO 66
                  IF (LOC .EQ. KOL) GO TO 67
                  IF (LOC .NE. KOL) GO TO 68
                  IF (LOC .LT. KOLUMN) GO TO 69
                  IF (LOC .GT. KOLUMN) GO TO 70
130     CONTINUE
135     52      LROW(KOL) = I
140     55      LCOL(KOL) = J
145     56      ROW(KOL) = SFMAT(LOC)
150     57      IF (J .EQ. JCOLS) GO TO 35
155     58      IF (KOL .LT. KOLUMN) GO TO 55
160     59      IF (KOL .EQ. KOLUMN) GO TO 56
165     60      IF (KOL .GT. KOLUMN) GO TO 57
170     61      IF (KOUNT .GT. KOUNTH .AND. I .EQ. 1) GO TO 68
175     62      CONTINUE
180     63      WRITE (ITAPEW,2001)
          CALL PLB (1,1,ITAPEW)
185     64      WRITE (ITAPEW,2002) ((HEAD(IH,JH),IH=1,5),JH=1,KOLUMN)
          KOUNT = KOUNT + 3
190     65      CONTINUE
195     66      KOUNT = KOUNT + 1
200     67      WRITE (ITAPEW,2003) (LROW(KOL), LCOL(KOL), ROW(KOL), KOL=1,JCU)
          IF (J .LT. JCOLS) GO TO 52
205     68      CONTINUE
210     69      GO TO 195
215     70      CONTINUE
220     71      LOC = 0
225     72      IROWS = IROW
230     73      DO 190 I=1,IROWS
235     74      DO 152 J=1,I
240     75      LOC = LOC + 1
245     76      ROW(J) = SFMAT(LOC)
250     77      CONTINUE
255     78      IF (LOC .EQ. KOUNT) GO TO 195
260     79      CONTINUE
265     80      IF (LOC .EQ. KOUNT) GO TO 195
270     81      CONTINUE
275     82      LOC = 0
280     83      IROWS = IROW
285     84      DO 190 I=1,IROWS
290     85      DO 152 J=1,I
295     86      LOC = LOC + 1
300     87      ROW(J) = SFMAT(LOC)
305     88      CONTINUE
310     89      IF (LOC .EQ. KOUNT) GO TO 195
315     90      CONTINUE
320     91      LOC = 0
325     92      IROWS = IROW
330     93      DO 190 I=1,IROWS
335     94      DO 152 J=1,I
340     95      LOC = LOC + 1
345     96      ROW(J) = SFMAT(LOC)
350     97      CONTINUE
355     98      IF (LOC .EQ. KOUNT) GO TO 195
360     99      CONTINUE
365    100      LOC = 0
370    101      IROWS = IROW
375    102      DO 190 I=1,IROWS
380    103      DO 152 J=1,I
385    104      LOC = LOC + 1
390    105      ROW(J) = SFMAT(LOC)
395    106      CONTINUE
400    107      IF (LOC .EQ. KOUNT) GO TO 195
405    108      CONTINUE
410    109      LOC = 0
415    110      IROWS = IROW
420    111      DO 190 I=1,IROWS
425    112      DO 152 J=1,I
430    113      LOC = LOC + 1
435    114      ROW(J) = SFMAT(LOC)
440    115      CONTINUE
445    116      IF (LOC .EQ. KOUNT) GO TO 195
450    117      CONTINUE
455    118      LOC = 0
460    119      IROWS = IROW
465    120      DO 190 I=1,IROWS
470    121      DO 152 J=1,I
475    122      LOC = LOC + 1
480    123      ROW(J) = SFMAT(LOC)
485    124      CONTINUE
490    125      IF (LOC .EQ. KOUNT) GO TO 195
495    126      CONTINUE
500    127      LOC = 0
505    128      IROWS = IROW
510    129      DO 190 I=1,IROWS
515    130      DO 152 J=1,I
520    131      LOC = LOC + 1
525    132      ROW(J) = SFMAT(LOC)
530    133      CONTINUE
535    134      IF (LOC .EQ. KOUNT) GO TO 195
540    135      CONTINUE
545    136      LOC = 0
550    137      IROWS = IROW
555    138      DO 190 I=1,IROWS
560    139      DO 152 J=1,I
565    140      LOC = LOC + 1
570    141      ROW(J) = SFMAT(LOC)
575    142      CONTINUE
580    143      IF (LOC .EQ. KOUNT) GO TO 195
585    144      CONTINUE
590    145      LOC = 0
595    146      IROWS = IROW
600    147      DO 190 I=1,IROWS
605    148      DO 152 J=1,I
610    149      LOC = LOC + 1
615    150      ROW(J) = SFMAT(LOC)
620    151      CONTINUE
625    152      IF (LOC .EQ. KOUNT) GO TO 195
630    153      CONTINUE
635    154      LOC = 0
640    155      IROWS = IROW
645    156      DO 190 I=1,IROWS
650    157      DO 152 J=1,I
655    158      LOC = LOC + 1
660    159      ROW(J) = SFMAT(LOC)
665    160      CONTINUE
670    161      IF (LOC .EQ. KOUNT) GO TO 195
675    162      CONTINUE
680    163      LOC = 0
685    164      IROWS = IROW
690    165      DO 190 I=1,IROWS
695    166      DO 152 J=1,I
700    167      LOC = LOC + 1
705    168      ROW(J) = SFMAT(LOC)
710    169      CONTINUE
715    170      IF (LOC .EQ. KOUNT) GO TO 195
720    171      CONTINUE
725    172      LOC = 0
730    173      IROWS = IROW
735    174      DO 190 I=1,IROWS
740    175      DO 152 J=1,I
745    176      LOC = LOC + 1
750    177      ROW(J) = SFMAT(LOC)
755    178      CONTINUE
760    179      IF (LOC .EQ. KOUNT) GO TO 195
765    180      CONTINUE
770    181      LOC = 0
775    182      IROWS = IROW
780    183      DO 190 I=1,IROWS
785    184      DO 152 J=1,I
790    185      LOC = LOC + 1
795    186      ROW(J) = SFMAT(LOC)
800    187      CONTINUE
805    188      IF (LOC .EQ. KOUNT) GO TO 195
810    189      CONTINUE
815    190      LOC = 0
820    191      IROWS = IROW
825    192      DO 190 I=1,IROWS
830    193      DO 152 J=1,I
835    194      LOC = LOC + 1
840    195      ROW(J) = SFMAT(LOC)
845    196      CONTINUE
850    197      IF (LOC .EQ. KOUNT) GO TO 195
855    198      CONTINUE
860    199      LOC = 0
865    200      IROWS = IROW
870    201      DO 190 I=1,IROWS
875    202      DO 152 J=1,I
880    203      LOC = LOC + 1
885    204      ROW(J) = SFMAT(LOC)
890    205      CONTINUE
895    206      IF (LOC .EQ. KOUNT) GO TO 195
900    207      CONTINUE
905    208      LOC = 0
910    209      IROWS = IROW
915    210      DO 190 I=1,IROWS
920    211      DO 152 J=1,I
925    212      LOC = LOC + 1
930    213      ROW(J) = SFMAT(LOC)
935    214      CONTINUE
940    215      IF (LOC .EQ. KOUNT) GO TO 195
945    216      CONTINUE
950    217      LOC = 0
955    218      IROWS = IROW
960    219      DO 190 I=1,IROWS
965    220      DO 152 J=1,I
970    221      LOC = LOC + 1
975    222      ROW(J) = SFMAT(LOC)
980    223      CONTINUE
985    224      IF (LOC .EQ. KOUNT) GO TO 195
990    225      CONTINUE
995    226      LOC = 0
1000   227      IROWS = IROW
1005   228      DO 190 I=1,IROWS
1010   229      DO 152 J=1,I
1015   230      LOC = LOC + 1
1020   231      ROW(J) = SFMAT(LOC)
1025   232      CONTINUE
1030   233      IF (LOC .EQ. KOUNT) GO TO 195
1035   234      CONTINUE
1040   235      LOC = 0
1045   236      IROWS = IROW
1050   237      DO 190 I=1,IROWS
1055   238      DO 152 J=1,I
1060   239      LOC = LOC + 1
1065   240      ROW(J) = SFMAT(LOC)
1070   241      CONTINUE
1075   242      IF (LOC .EQ. KOUNT) GO TO 195
1080   243      CONTINUE
1085   244      LOC = 0
1090   245      IROWS = IROW
1095   246      DO 190 I=1,IROWS
1100   247      DO 152 J=1,I
1105   248      LOC = LOC + 1
1110   249      ROW(J) = SFMAT(LOC)
1115   250      CONTINUE
1120   251      IF (LOC .EQ. KOUNT) GO TO 195
1125   252      CONTINUE
1130   253      LOC = 0
1135   254      IROWS = IROW
1140   255      DO 190 I=1,IROWS
1145   256      DO 152 J=1,I
1150   257      LOC = LOC + 1
1155   258      ROW(J) = SFMAT(LOC)
1160   259      CONTINUE
1165   260      IF (LOC .EQ. KOUNT) GO TO 195
1170   261      CONTINUE
1175   262      LOC = 0
1180   263      IROWS = IROW
1185   264      DO 190 I=1,IROWS
1190   265      DO 152 J=1,I
1195   266      LOC = LOC + 1
1200   267      ROW(J) = SFMAT(LOC)
1205   268      CONTINUE
1210   269      IF (LOC .EQ. KOUNT) GO TO 195
1215   270      CONTINUE
1220   271      LOC = 0
1225   272      IROWS = IROW
1230   273      DO 190 I=1,IROWS
1235   274      DO 152 J=1,I
1240   275      LOC = LOC + 1
1245   276      ROW(J) = SFMAT(LOC)
1250   277      CONTINUE
1255   278      IF (LOC .EQ. KOUNT) GO TO 195
1260   279      CONTINUE
1265   280      LOC = 0
1270   281      IROWS = IROW
1275   282      DO 190 I=1,IROWS
1280   283      DO 152 J=1,I
1285   284      LOC = LOC + 1
1290   285      ROW(J) = SFMAT(LOC)
1295   286      CONTINUE
1300   287      IF (LOC .EQ. KOUNT) GO TO 195
1305   288      CONTINUE
1310   289      LOC = 0
1315   290      IROWS = IROW
1320   291      DO 190 I=1,IROWS
1325   292      DO 152 J=1,I
1330   293      LOC = LOC + 1
1335   294      ROW(J) = SFMAT(LOC)
1340   295      CONTINUE
1345   296      IF (LOC .EQ. KOUNT) GO TO 195
1350   297      CONTINUE
1355   298      LOC = 0
1360   299      IROWS = IROW
1365   300      DO 190 I=1,IROWS
1370   301      DO 152 J=1,I
1375   302      LOC = LOC + 1
1380   303      ROW(J) = SFMAT(LOC)
1385   304      CONTINUE
1390   305      IF (LOC .EQ. KOUNT) GO TO 195
1395   306      CONTINUE
1400   307      LOC = 0
1405   308      IROWS = IROW
1410   309      DO 190 I=1,IROWS
1415   310      DO 152 J=1,I
1420   311      LOC = LOC + 1
1425   312      ROW(J) = SFMAT(LOC)
1430   313      CONTINUE
1435   314      IF (LOC .EQ. KOUNT) GO TO 195
1440   315      CONTINUE
1445   316      LOC = 0
1450   317      IROWS = IROW
1455   318      DO 190 I=1,IROWS
1460   319      DO 152 J=1,I
1465   320      LOC = LOC + 1
1470   321      ROW(J) = SFMAT(LOC)
1475   322      CONTINUE
1480   323      IF (LOC .EQ. KOUNT) GO TO 195
1485   324      CONTINUE
1490   325      LOC = 0
1495   326      IROWS = IROW
1500   327      DO 190 I=1,IROWS
1505   328      DO 152 J=1,I
1510   329      LOC = LOC + 1
1515   330      ROW(J) = SFMAT(LOC)
1520   331      CONTINUE
1525   332      IF (LOC .EQ. KOUNT) GO TO 195
1530   333      CONTINUE
1535   334      LOC = 0
1540   335      IROWS = IROW
1545   336      DO 190 I=1,IROWS
1550   337      DO 152 J=1,I
1555   338      LOC = LOC + 1
1560   339      ROW(J) = SFMAT(LOC)
1565   340      CONTINUE
1570   341      IF (LOC .EQ. KOUNT) GO TO 195
1575   342      CONTINUE
1580   343      LOC = 0
1585   344      IROWS = IROW
1590   345      DO 190 I=1,IROWS
1595   346      DO 152 J=1,I
1600   347      LOC = LOC + 1
1605   348      ROW(J) = SFMAT(LOC)
1610   349      CONTINUE
1615   350      IF (LOC .EQ. KOUNT) GO TO 195
1620   351      CONTINUE
1625   352      LOC = 0
1630   353      IROWS = IROW
1635   354      DO 190 I=1,IROWS
1640   355      DO 152 J=1,I
1645   356      LOC = LOC + 1
1650   357      ROW(J) = SFMAT(LOC)
1655   358      CONTINUE
1660   359      IF (LOC .EQ. KOUNT) GO TO 195
1665   360      CONTINUE
1670   361      LOC = 0
1675   362      IROWS = IROW
1680   363      DO 190 I=1,IROWS
1685   364      DO 152 J=1,I
1690   365      LOC = LOC + 1
1695   366      ROW(J) = SFMAT(LOC)
1700   367      CONTINUE
1705   368      IF (LOC .EQ. KOUNT) GO TO 195
1710   369      CONTINUE
1715   370      LOC = 0
1720   371      IROWS = IROW
1725   372      DO 190 I=1,IROWS
1730   373      DO 152 J=1,I
1735   374      LOC = LOC + 1
1740   375      ROW(J) = SFMAT(LOC)
1745   376      CONTINUE
1750   377      IF (LOC .EQ. KOUNT) GO TO 195
1755   378      CONTINUE
1760   379      LOC = 0
1765   380      IROWS = IROW
1770   381      DO 190 I=1,IROWS
1775   382      DO 152 J=1,I
1780   383      LOC = LOC + 1
1785   384      ROW(J) = SFMAT(LOC)
1790   385      CONTINUE
1795   386      IF (LOC .EQ. KOUNT) GO TO 195
1800   387      CONTINUE
1805   388      LOC = 0
1810   389      IROWS = IROW
1815   390      DO 190 I=1,IROWS
1820   391      DO 152 J=1,I
1825   392      LOC = LOC + 1
1830   393      ROW(J) = SFMAT(LOC)
1835   394      CONTINUE
1840   395      IF (LOC .EQ. KOUNT) GO TO 195
1845   396      CONTINUE
1850   397      LOC = 0
1855   398      IROWS = IROW
1860   399      DO 190 I=1,IROWS
1865   400      DO 152 J=1,I
1870   401      LOC = LOC + 1
1875   402      ROW(J) = SFMAT(LOC)
1880   403      CONTINUE
1885   404      IF (LOC .EQ. KOUNT) GO TO 195
1890   405      CONTINUE
1895   406      LOC = 0
1900   407      IROWS = IROW
1905   408      DO 190 I=1,IROWS
1910   409      DO 152 J=1,I
1915   410      LOC = LOC + 1
1920   411      ROW(J) = SFMAT(LOC)
1925   412      CONTINUE
1930   413      IF (LOC .EQ. KOUNT) GO TO 195
1935   414      CONTINUE
1940   415      LOC = 0
1945   416      IROWS = IROW
1950   417      DO 190 I=1,IROWS
1955   418      DO 152 J=1,I
1960   419      LOC = LOC + 1
1965   420      ROW(J) = SFMAT(LOC)
1970   421      CONTINUE
1975   422      IF (LOC .EQ. KOUNT) GO TO 195
1980   423      CONTINUE
1985   424      LOC = 0
1990   425      IROWS = IROW
1995   426      DO 190 I=1,IROWS
2000   427      DO 152 J=1,I
2005   428      LOC = LOC + 1
2010   429      ROW(J) = SFMAT(LOC)
2015   430      CONTINUE
2020   431      IF (LOC .EQ. KOUNT) GO TO 195
2025   432      CONTINUE
2030   433      LOC = 0
2035   434      IROWS = IROW
2040   435      DO 190 I=1,IROWS
2045   436      DO 152 J=1,I
2050   437      LOC = LOC + 1
2055   438      ROW(J) = SFMAT(LOC)
2060   439      CONTINUE
2065   440      IF (LOC .EQ. KOUNT) GO TO 195
2070   441      CONTINUE
2075   442      LOC = 0
2080   443      IROWS = IROW
2085   444      DO 190 I=1,IROWS
2090   445      DO 152 J=1,I
2095   446      LOC = LOC + 1
2100   447      ROW(J) = SFMAT(LOC)
2105   448      CONTINUE
2110   449      IF (LOC .EQ. KOUNT) GO TO 195
2115   450      CONTINUE
2120   451      LOC = 0
2125   452      IROWS = IROW
2130   453      DO 190 I=1,IROWS
2135   454      DO 152 J=1,I
2140   455      LOC = LOC + 1
2145   456      ROW(J) = SFMAT(LOC)
2150   457      CONTINUE
2155   458      IF (LOC .EQ. KOUNT) GO TO 195
2160   459      CONTINUE
2165   460      LOC = 0
2170   461      IROWS = IROW
2175   462      DO 190 I=1,IROWS
2180   463      DO 152 J=1,I
2185   464      LOC = LOC + 1
2190   465      ROW(J) = SFMAT(LOC)
2195   466      CONTINUE
2200   467      IF (LOC .EQ. KOUNT) GO TO 195
2205   468      CONTINUE
2210   469      LOC = 0
2215   470      IROWS = IROW
2220   471      DO 190 I=1,IROWS
2225   472      DO 152 J=1,I
2230   473      LOC = LOC + 1
2235   474      ROW(J) = SFMAT(LOC)
2240   475      CONTINUE
2245   476      IF (LOC .EQ. KOUNT) GO TO 195
2250   477      CONTINUE
2255   478      LOC = 0
2260   479      IROWS = IROW
2265   480      DO 190 I=1,IROWS
2270   481      DO 152 J=1,I
2275   482      LOC = LOC + 1
2280   483      ROW(J) = SFMAT(LOC)
2285   484      CONTINUE
2290   485      IF (LOC .EQ. KOUNT) GO TO 195
2295   486      CONTINUE
2300   487      LOC = 0
2305   488      IROWS = IROW
2310   489      DO 190 I=1,IROWS
2315   490      DO 152 J=1,I
2320   491      LOC = LOC + 1
2325   492      ROW(J) = SFMAT(LOC)
2330   493      CONTINUE
2335   494      IF (LOC .EQ. KOUNT) GO TO 195
2340   495      CONTINUE
2345   496      LOC = 0
2350   497      IROWS = IROW
2355   498      DO 190 I=1,IROWS
2360   499      DO 152 J=1,I
2365   500      LOC = LOC + 1
2370   501      ROW(J) = SFMAT(LOC)
2375   502      CONTINUE
2380   503      IF (LOC .EQ. KOUNT) GO TO 195
2385   504      CONTINUE
2390   505      LOC = 0
2395   506      IROWS = IROW
2400   507      DO 190 I=1,IROWS
2405   508      DO 152 J=1,I
2410   509      LOC = LOC + 1
2415   510      ROW(J) = SFMAT(LOC)
2420   511      CONTINUE
2425   512      IF (LOC .EQ. KOUNT) GO TO 195
2430   513      CONTINUE
2435   514      LOC = 0
2440   515      IROWS = IROW
2445   516      DO 190 I=1,IROWS
2450   517      DO 152 J=1,I
2455   518      LOC = LOC + 1
2460   519      ROW(J) = SFMAT(LOC)
2465   520      CONTINUE
2470   521      IF (LOC .EQ. KOUNT) GO TO 195
2475   522      CONTINUE
2480   523      LOC = 0
2485   524      IROWS = IROW
2490   525      DO 190 I=1,IROWS
2495   526      DO 152 J=1,I
2500   527      LOC = LOC + 1
2505   528      ROW(J) = SFMAT(LOC)
2510   529      CONTINUE
2515   530      IF (LOC .EQ. KOUNT) GO TO 195
2520   531      CONTINUE
2525   532      LOC = 0
2530   533      IROWS = IROW
2535   534      DO 190 I=1,IROWS
2540   535      DO 152 J=1,I
2545   536      LOC = LOC + 1
2550   537      ROW(J) = SFMAT(LOC)
2555   538      CONTINUE
2560   539      IF (LOC .EQ. KOUNT) GO TO 195
2565   540      CONTINUE
2570   541      LOC = 0
2575   542      IROWS = IROW
2580   543      DO 190 I=1,IROWS
2585   544      DO 152 J=1,I
2590   545      LOC = LOC + 1
2595   546      ROW(J) = SFMAT(LOC)
2600   547      CONTINUE
2605   548      IF (LOC .EQ. KOUNT) GO TO 195
2610   549      CONTINUE
2615   550      LOC = 0
2620   551      IROWS = IROW
2625   552      DO 190 I=1,IROWS
2630   553      DO 152 J=1,I
2635   554      LOC = LOC + 1
2640   555      ROW(J) = SFMAT(LOC)
2645   556      CONTINUE
2650   557      IF (LOC .EQ. KOUNT) GO TO 195
2655   558      CONTINUE
2660   559      LOC = 0
2665   560      IROWS = IROW
2670   561      DO 190 I=1,IROWS
2675   562      DO 152 J=1,I
2680   563      LOC = LOC + 1
2685   564      ROW(J) = SFMAT(LOC)
2690   565      CONTINUE
2695   566      IF (LOC .EQ. KOUNT) GO TO 195
2700   567      CONTINUE
2705   568      LOC = 0
2710   569      IROWS = IROW
2715   570      DO 190 I=1,IROWS
2720   571      DO 152 J=1,I
2725   572      LOC = LOC + 1
2730   573      ROW(J) = SFMAT(LOC)
2735   574      CONTINUE
2740   575      IF (LOC .EQ. KOUNT) GO TO 195
2745   576      CONTINUE
2750   577      LOC = 0
2755   578      IROWS = IROW
2760   579      DO 190 I=1,IROWS
2765   580      DO 152 J=1,I
2770   581      LOC = LOC + 1
2775   582      ROW(J) = SFMAT(LOC)
2780   583      CONTINUE
2785   584      IF (LOC .EQ. KOUNT) GO TO 195
2790   585      CONTINUE
2795   586      LOC = 0
2800   587      IROWS = IROW
2805   588      DO 190 I=1,IROWS
2810   589      DO 152 J=1,I
2815   590      LOC = LOC + 1
2820   591      ROW(J) = SFMAT(LOC)
2825   592      CONTINUE
2830   593      IF (LOC .EQ. KOUNT) GO TO 195
2835   594      CONTINUE
2840   595      LOC = 0
2845   596      IROWS = IROW
2850   597      DO 190 I=1,IROWS
2855   598      DO 152 J=1,I
2860   599      LOC = LOC + 1
2865   600      ROW(J) = SFMAT(LOC)
2870   601      CONTINUE
2875   602      IF (LOC .EQ. KOUNT) GO TO 195
2880   603      CONTINUE
2885   604      LOC = 0
2890   605      IROWS = IROW
2895   606      DO 190 I=1,IROWS
2900   607      DO 152 J=1,I
2905   608      LOC = LOC + 1
2910   609      ROW(J) = SFMAT(LOC)
2915   610      CONTINUE
2920   611      IF (LOC .EQ. KOUNT) GO TO 195
2925   612      CONTINUE
2930   613      LOC = 0
2935   614      IROWS = IROW
2940   615      DO 190 I=1,IROWS
2945   616      DO 152 J=1,I
2950   617      LOC = LOC + 1
2955   618      ROW(J) = SFMAT(LOC)
2960   619      CONTINUE
2965   620      IF (LOC .EQ. KOUNT) GO TO 195
2970   621      CONTINUE
2975   622      LOC = 0
2980   623      IROWS = IROW
2985   624      DO 190 I=1,IROWS
2990   625      DO 152 J=1,I
2995   626      LOC = LOC + 1
3000   627      ROW(J) = SFMAT(LOC)
3005   628      CONTINUE
3010   629      IF (LOC .EQ. KOUNT) GO TO 195
3015   630      CONTINUE
3020   631      LOC = 0
3025   632      IROWS = IROW
3030   633      DO 190 I=1,IROWS
3035   634      DO 152 J=1,I
3040   635      LOC = LOC + 1
3045   636      ROW(J) = SFMAT(LOC)
3050   637      CONTINUE
3055   638      IF (LOC .EQ. KOUNT) GO TO 195
3060   639      CONTINUE
3065   640      LOC = 0
3070   641      IROWS = IROW
3075   642      DO 190 I=1,IROWS
3080   643      DO 152 J=1,I
3085   644      LOC = LOC + 1
3090   645      ROW(J) = SFMAT(LOC)
3095   646      CONTINUE
3100   647      IF (LOC .EQ. KOUNT) GO TO 195
3105   648      CONTINUE
3110   649      LOC = 0
3115   650      IROWS = IROW
3120   651      DO 190 I=1,IROWS
3125   652      DO 152 J=1,I
3130   653      LOC = LOC + 1
3135   654      ROW(J) = SFMAT(LOC)
3140   655      CONTINUE
3145   656      IF (LOC .EQ. KOUNT) GO TO 195
3150   657      CONTINUE
3155   658      LOC = 0
3160   659      IROWS = IROW
3165   660      DO 190 I=1,IROWS
3170   661      DO 152 J=1,I
3175   662      LOC = LOC + 1
3180   663      ROW(J) = SFMAT(LOC)
3185   664      CONTINUE
3190   665      IF (LOC .EQ. KOUNT) GO TO 1
```

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SUBROUTINE COMPAK    74/74   OPT=1           FTN 4.8+577      85/01/23. 08.10.44
                                                                PAGE   4

          JCOLS = I
          JCL  = JCU + 1
          JCU = JCU + KOLUMN
          JCU = MINOF(JCU,JCOLS)
          CALL TITLES (2)
          CALL PTABLE (2,35,35
1       HFLEXIBILITY MATRIX IN DYNAMICS GRID)
          IF (KOUNT .GT. KOUNTH AND. I .EQ. 1) GO TO 158
          IF (KOUNT .GT. KOUNTH) GO TO 160
158 CONTINUE
          CALL PLB (1,1,ITAPEW)
          WRITE (ITAPEW,3001)
          KOUNT = KOUNT + 2
160 CONTINUE
          KOUNT = KOUNT + 1
          WRITE (ITAPEW,3003) I, JCL, (ROW(J), J=JCL,JCU)
          IF (JCU .LT. JCOLS) GO TO 155
190 CONTINUE
195 CONTINUE
          C
          C FORMATS
          2001 FORMAT (10X, 16HSTIFFNESS MATRIX)
          2002 FORMAT (10X, 5(2X, 5A4))
          2003 FORMAT (10X, 5(215, 1P1E12.4))
          3001 FORMAT (10X, 2X, 3HROW, 2X, 3HCOL, 2X
1       18HFLEXIBILITY MATRIX)
          3003 FORMAT (10X, 215, 1P8E14.6)
          C
          RETURN
          END

```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

97 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	RELATION	REFERENCES
3 COMPAK	32	201	
VARIABLES	SN	TYPE	
15 D	REAL	KLUES	REFS 58
27 DBAL	REAL	KLUES	REFS 58
16 DEL	REAL	KLUES	REFS 58
12 DMAX	REAL	KLUES	REFS 58
11 EPS1	REAL	KLUES	REFS 58
17 EPS2	REAL	KLUES	REFS 58
456 HEAD	REAL	ARRAY	REFS 34 156 DEFINED 84
507 HOLD	REAL	ARRAY	REFS 34 84 DEFINED 81

SUBROUTINE COMPAK		74/74 RELOCATION	
VARIABLES	SN	TYPE	
451	1	INTEGER	
22	IBAND	INTEGER	KLUES
7	IDNOPT	INTEGER	KLUES
21	IFA	INTEGER	PLACES
67	IFADD	INTEGER	PLACES
41	IFADDI	INTEGER	PLACES
33	IFB	INTEGER	PLACES
71	IFBAL	INTEGER	PLACES
43	IFBALI	INTEGER	PLACES
117	IFBR	INTEGER	PLACES
53	IFBT	INTEGER	PLACES
73	IFDESF	INTEGER	PLACES
45	IFDESI	INTEGER	PLACES
55	IFDESN	INTEGER	PLACES
35	IFDESO	INTEGER	PLACES
77	IFDUM1	INTEGER	PLACES
101	IFDUM2	INTEGER	PLACES
103	IFDUM3	INTEGER	PLACES
442	IFILE	INTEGER	PLACES
23	IFIN	INTEGER	KLUES
141	IFINCK	INTEGER	PLACES
137	IFINCM	INTEGER	PLACES
31	IFKS	INTEGER	PLACES
105	IFL	INTEGER	PLACES
115	IFLR	INTEGER	PLACES
57	IFMD	INTEGER	PLACES
65	IFMDB	INTEGER	PLACES
37	IFMDBI	INTEGER	PLACES
61	IFMEMF	INTEGER	PLACES
25	IFMEMN	INTEGER	PLACES
51	IFMEMO	INTEGER	PLACES
125	IFMODK	INTEGER	PLACES
123	IFMODM	INTEGER	PLACES
135	IFPH	INTEGER	PLACES
127	IFPHT	INTEGER	PLACES
121	IFPHTF	INTEGER	PLACES
133	IFQ	INTEGER	PLACES
131	IFQT	INTEGER	PLACES
11	IFSCTR	INTEGER	PLACES
27	IFSFTN	INTEGER	PLACES
63	IFSFTD	INTEGER	PLACES
12	IFS1	INTEGER	PLACES
13	IFS2	INTEGER	PLACES
14	IFS3	INTEGER	PLACES
15	IFS4	INTEGER	PLACES
75	IFWT	INTEGER	PLACES
47	IFWTI	INTEGER	PLACES
23	IFY	INTEGER	PLACES
107	IFYT	INTEGER	PLACES
111	IFZ	INTEGER	PLACES
113	IFZR	INTEGER	PLACES
432	IH	INTEGER	FILE
0	IPOS	INTEGER	KLUES
2	IRED	INTEGER	F.P.
0	IROW	INTEGER	E.B.
0	IPOND	INTEGER	

SUBROUTINE	COMPAK	74/74	OPT= 1	RELOCATION	
VARIABLES	SN	TYPE			
450	IROWS	INTEGER		ARRAY	MATRIX
0	ISETUP	INTEGER			COMRWP
2	ITAPEP	INTEGER			COMRWP
0	ITAPER	INTEGER		ARRAY	CTAPES
0	ITAPES	INTEGER			COMRWP
7	ITAPET	INTEGER			CTABLE
1	ITAPEW	INTEGER			REFS
20	IUA	INTEGER			REFS
66	IUADD	INTEGER		PLACES	REFS
40	IUADDI	INTEGER		PLACES	REFS
32	IUB	INTEGER		PLACES	REFS
70	IUBAL	INTEGER		PLACES	REFS
42	IUBALI	INTEGER		PLACES	REFS
116	IUBR	INTEGER		PLACES	REFS
52	IUBT	INTEGER		PLACES	REFS
16	IUCD	INTEGER		PLACES	REFS
72	IUDESF	INTEGER		PLACES	REFS
44	IUDESI	INTEGER		PLACES	REFS
54	IUDEN	INTEGER		PLACES	REFS
34	IUDESO	INTEGER		PLACES	REFS
76	IUDUM1	INTEGER		PLACES	REFS
100	IUDUM2	INTEGER		PLACES	REFS
102	IUDUM3	INTEGER		PLACES	REFS
4	IUG01	INTEGER		PLACES	REFS
5	IUG02	INTEGER		PLACES	REFS
6	IUG03	INTEGER		PLACES	REFS
7	IUG04	INTEGER		PLACES	REFS
140	IUINCK	INTEGER		PLACES	REFS
136	IUINCM	INTEGER		PLACES	REFS
0	IUIN1	INTEGER		PLACES	REFS
1	IUIN2	INTEGER		PLACES	REFS
30	IUKS	INTEGER		PLACES	REFS
104	IUL	INTEGER		PLACES	REFS
114	IULR	INTEGER		PLACES	REFS
56	IUMD	INTEGER		PLACES	REFS
64	IUMDB	INTEGER		PLACES	REFS
36	IUMDBI	INTEGER		PLACES	REFS
60	IUMEMD	INTEGER		PLACES	REFS
24	IUMEMN	INTEGER		PLACES	REFS
50	IUMEMO	INTEGER		PLACES	REFS
124	IUMODK	INTEGER		PLACES	REFS
122	IUMODM	INTEGER		PLACES	REFS
2	IOUT1	INTEGER		PLACES	REFS
3	IOUT2	INTEGER		PLACES	REFS
134	IUPH	INTEGER		PLACES	REFS
126	IUPHT	INTEGER		PLACES	REFS
120	IUPHTF	INTEGER		PLACES	REFS
17	IUPR	INTEGER		PLACES	REFS
132	IUQ	INTEGER		PLACES	REFS
130	IUQT	INTEGER		PLACES	REFS
10	IUSCR	INTEGER		PLACES	REFS
26	IUSTFN	INTEGER		PLACES	REFS
62	IUSTFO	INTEGER		PLACES	REFS
74	IUWT	INTEGER		PLACES	REFS
46	IUWTI	INTEGER		PLACES	REFS

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VARIABLES	SN	TYPE	RELOCATION	REFS	REFS
0	ISETUP	INTEGER	ARRAY	REFS	REFS
2	ITAPEP	INTEGER		REFS	REFS
0	ITAPER	INTEGER		REFS	REFS
0	ITAPES	INTEGER		REFS	REFS
7	ITAPET	INTEGER		REFS	REFS
1	ITAPEW	INTEGER		1/O REF	1/O REF
20	IUA	INTEGER		PLACES	PLACES
66	IUADD	INTEGER		PLACES	PLACES
40	IUADDI	INTEGER		PLACES	PLACES
32	IUB	INTEGER		PLACES	PLACES
70	IUBAL	INTEGER		PLACES	PLACES
42	IUBALI	INTEGER		PLACES	PLACES
116	IUBR	INTEGER		PLACES	PLACES
52	IUBT	INTEGER		PLACES	PLACES
16	IUCD	INTEGER		PLACES	PLACES
72	IUDESF	INTEGER		PLACES	PLACES
44	IUDESI	INTEGER		PLACES	PLACES
54	IUDEN	INTEGER		PLACES	PLACES
34	IUDESO	INTEGER		PLACES	PLACES
76	IUDUM1	INTEGER		PLACES	PLACES
100	IUDUM2	INTEGER		PLACES	PLACES
102	IUDUM3	INTEGER		PLACES	PLACES
4	IUG01	INTEGER		PLACES	PLACES
5	IUG02	INTEGER		PLACES	PLACES
6	IUG03	INTEGER		PLACES	PLACES
7	IUG04	INTEGER		PLACES	PLACES
140	IUINCK	INTEGER		PLACES	PLACES
136	IUINCM	INTEGER		PLACES	PLACES
0	IUIN1	INTEGER		PLACES	PLACES
1	IUIN2	INTEGER		PLACES	PLACES
30	IUKS	INTEGER		PLACES	PLACES
104	IUL	INTEGER		PLACES	PLACES
114	IULR	INTEGER		PLACES	PLACES
56	IUMD	INTEGER		PLACES	PLACES
64	IUMDB	INTEGER		PLACES	PLACES
36	IUMDBI	INTEGER		PLACES	PLACES
60	IUMEMD	INTEGER		PLACES	PLACES
24	IUMEMN	INTEGER		PLACES	PLACES
50	IUMEMO	INTEGER		PLACES	PLACES
124	IUMODK	INTEGER		PLACES	PLACES
122	IUMODM	INTEGER		PLACES	PLACES
2	IOUT1	INTEGER		PLACES	PLACES
3	IOUT2	INTEGER		PLACES	PLACES
134	IUPH	INTEGER		PLACES	PLACES
126	IUPHT	INTEGER		PLACES	PLACES
120	IUPHTF	INTEGER		PLACES	PLACES
17	IUPR	INTEGER		PLACES	PLACES
132	IUQ	INTEGER		PLACES	PLACES
130	IUQT	INTEGER		PLACES	PLACES
10	IUSCR	INTEGER		PLACES	PLACES
26	IUSTFN	INTEGER		PLACES	PLACES
62	IUSTFO	INTEGER		PLACES	PLACES
74	IUWT	INTEGER		PLACES	PLACES
46	IUWTI	INTEGER		PLACES	PLACES

SUBROUTINE	COMPACT	74/74	OPT.-1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	7
VARIABLES	SN	TYPE	RELOCATION					
106	IUYT	INTEGER	PLACES	REFS	41			
110	IUZ	INTEGER	PLACES	REFS	41			
112	IUZR	INTEGER	PLACES	REFS	41			
445	J	INTEGER						
455	JCL	INTEGER						
452	JCOLS	INTEGER						
454	JCU	INTEGER						
433	JH	INTEGER						
7	KBPAGE	INTEGER	CLIST	REFS	139	138	143	145
4	KLABEL	INTEGER	CLIST	REFS	135	134	138	161
440	KLISTV	INTEGER						
24	KLUB	INTEGER	KLUES	REFS	160	172	175	168
4	KLUBAL	INTEGER	KLUES	REFS	147	173	174	188
1	KLUEV	INTEGER	KLUES	REFS	171	174	175	187
3	KLUMD	INTEGER	KLUES	REFS	156	156	156	156
1	KLUNAL	INTEGER	KLUES	REFS	84	84	83	156
25	KLUQ	INTEGER	KLUES	REFS	61	61		
0	KLUSE	INTEGER	KLUES	REFS	61			
437	KMATV	INTEGER	CLUEV	REFS	61			
453	KOL	INTEGER	CLUEV	REFS	58	58		
443	KOLUMN	INTEGER						
0	KOUNT	INTEGER						
11	KOUNTH	INTEGER	CLIST	REFS	130	130	91	92
12	KOUNTI	INTEGER	CLIST	REFS	142	143	146	147
1	KPAGE	INTEGER	CLIST	REFS	136	141	160	3*160
0	KREPOR	INTEGER	REPORT	REFS	141	142		
0	KTABLE	INTEGER	CTABLE	REFS	136	141		
5	KTABLO	INTEGER	CTABLE	REFS	160	160		
5	KTPAGE	INTEGER	CLIST	REFS	146	156	174	129
446	L	INTEGER	CLIST	REFS	61	151	157	105
514	LCOL	INTEGER	CLIST	REFS	61	151	157	101
2	LINES	INTEGER	CLIST	REFS	61	151	159	105
10	LINESG	INTEGER	CLIST	REFS	61	151	159	180
3	LINEST	INTEGER	CLIST	REFS	61	151	159	186
0	LKLUV	INTEGER	CLUEV	REFS	61	151	159	
447	LOC	INTEGER	CLUEV	REFS	61	151	159	
521	LROW	INTEGER	ARRAY	CTSHV	136	160	179	
0	LTSHV	INTEGER	ARRAY	CTSHV	136	160	179	
436	MATNAM	INTEGER	ARRAY	CTSHV	136	160	179	
526	MORBAL	INTEGER	ARRAY	CTSHV	136	160	179	
26	MSADD	INTEGER	KLUES	REFS	61	65	65	118
13	NBAR	INTEGER	KLUES	REFS	61	65	65	
3	NCOLS	INTEGER	KLUES	REFS	61	65	65	
4	NCOLST	INTEGER	CTABLE	REFS	61	65	65	
20	NCYC	INTEGER	CTABLE	REFS	61	65	65	
14	NFIX	INTEGER	KLUES	REFS	61	65	65	
444	NM	INTEGER	KLUES	REFS	61	65	65	
435	NMATD	INTEGER	KLUES	REFS	61	65	65	
21	NNN	INTEGER	KLUES	REFS	61	65	65	

SUBROUTINE COMPAK		74/74		OPT=1		FTN 4.8+577		85/01/23. 08.10.44		PAGE 8	
VARIABLES	SN	TYPE	RELOCATION			REFS	61				
6 NPAGE		INTEGER	CLIST			REFS	63				
6 NPAGEA		INTEGER	CTABLE			REFS	58				
6 NPAS		INTEGER	KLUES			REFS	63				
1 NPASS		INTEGER	CTABLE			REFS	63				
2 NROWS		INTEGER	CTABLE			REFS	113	DEFINED	127	116	122
441 NTAPE		INTEGER	CTABLE			REFS	114	116	119	116	119
530 ROW		REAL	ARRAY			REFS	38	87	116	160	160
0 SFMAT		REAL	ARRAY	CPMASS	DEFINED	REFS	144	170	88	88	98
1 TSHV		REAL	ARRAY	CTSHV	DEFINED	REFS	38	67	144	144	187
10 VDES		REAL	REAL	KLUES	DEFINED	REFS	39	65	140	144	170
434 ZERO		REAL	REAL			REFS	58				
VARIABLES USED AS FILE NAMES. SEE ABOVE											
EXTERNALS		TYPE	ARGS		REFERENCES						
DCLOSE			1		122						
DVALUE			3		87						
GEDLAB			6		114						
GETROW			4		116						
PLB			3		155						
PROGNA			2		182						
PTABLE			3		95						
TITLES			1		149						
					177						
					111						
					148						
					176						
INLINE FUNCTIONS		TYPE	ARGS		REFERENCES						
MINO		INTEGER	0	INTRIN	122						
MINOF		INTEGER	2	SF	88						
					175						
					175						
STATEMENT LABELS			DEF LINE	REFERENCES							
0 5			84	82	83						
54 10			98	97							
64 12			103	97							
73 14			107	102							
0 20			120	117							
134 52			136	161							
135 55			137	140							
142 60			141	139							
153 65			147	145							
165 68			153	151							
201 70			158	152							
0 90			162	133							
226 92			164	130							
0 100			121	115							
0 152			170	168							
243 155			173	188							
260 158			181	179							
266 160			185	180							
0 190			189	167							
303 195			190	126							
404 2001		FMT	194	154							
410 2002		FMT	195	156							
413 2003		FMT	196	160							
416 3001		FMT	197	183							
424 3003		FMT	199	187							

SUBROUTINE	COMP	74/74	OPT=1	PROPERTIES
LOOPS	LABEL	INDEX	FROM-TO	LENGTH
7 5	IH	82 84	14B	INSTACK NOT INNER
15 5	JH	83 84	3B	INSTACK EXT REFS NOT INNER
103 100	J	115 121	15B	INSTACK EXT REFS NOT INNER
111 20	L	117 120	3B	INSTACK EXT REFS NOT INNER
132 90	I	133 162	73B	EXT REFS NOT INNER
205	KOL	160 160	12B	EXT REFS NOT INNER
231 190	J	167 189	52B	EXT REFS NOT INNER
235 152	J	168 170	3B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
PLACES	98	O IUIN1 (1) 3 IOUT2 (1) 6 IUG03 (1) 9 IFSCR (1) 12 IFS3 (1) 15 IUPR (1) 18 IUY (1) 21 IFMEMN (1) 24 IUKS (1) 27 IFB (1) 30 IUMOBI (1) 33 IFADDI (1) 36 IUDESI (1) 39 IFWTI (1) 42 IUBT (1) 45 IFDESN (1) 48 IUMEMF (1) 51 IFSTFO (1) 54 IUADD (1) 57 IFBAL (1) 60 IUWT (1) 63 IFDUM1 (1) 66 IUDUM3 (1) 69 IFL (1) 72 IUZ (1) 75 IFZR (1) 78 IUBR (1) 81 IFPHTF (1) 84 IUMODK (1) 87 IFPHT (1) 90 IUQ (1) 93 IFPH (1) 96 IUINCK (1) O KLUSE (1) 3 KLUMD (1) 6 NPAS (1) 9 EPS1 (1) 12 NFIX (1) 15 EPS2 (1) 18 IBAND (1) 21 KLUQ (1) O KOUNT (1) 3 LINEST (1) 6 NPAGE (1) 9 KOUNTH (1) O KTABLE (1)	1 IUIN2 (1) 4 IUG01 (1) 7 IUG04 (1) 10 IFS1 (1) 13 IFS4 (1) 16 IUA (1) 19 IFY (1) 22 IUSTFN (1) 25 IFKS (1) 28 IUDESO (1) 31 IFMDB1 (1) 34 IUBAL (1) 37 IUDESI (1) 40 IUMEMO (1) 43 IFBT (1) 46 IUMD (1) 49 IFMEMF (1) 52 IUMDB (1) 55 IFADD (1) 58 IUDESF (1) 61 IFWT (1) 64 IUDUM2 (1) 67 IFDUM3 (1) 70 IUYT (1) 73 IFZ (1) 76 IULR (1) 79 IFBR (1) 82 IUMODM (1) 85 IFMODK (1) 88 IUQT (1) 91 IFQ (1) 94 IUINCM (1) 97 IFINCK (1) 1 KLUNAL (1) 4 KLUBAL (1) 7 IDNOPT (1) 10 DWMAX (1) 13 D (1) 16 NCYC (1) 19 IFIN (1) 22 MORBAL (1) 1 KPAGE (1) 4 KLABEL (1) 7 KBPAGE (1) 10 KOUNT1 (1) 1 NPASS (1)	2 IUGOUT1 (1) 5 IUGO2 (1) 8 IUSCR (1) 11 IFS2 (1) 14 IUCD (1) 17 IFA (1) 20 IUMEMN (1) 23 IFSTFN (1) 26 IUB (1) 29 IFDESO (1) 32 IUADDI (1) 35 IFBALJ (1) 38 IWTI (1) 41 IFMEMO (1) 44 IUDESN (1) 47 IFMD (1) 50 IUFIFO (1) 53 IFMDB (1) 54 IUBAL (1) 55 IFDESF (1) 62 IUDUM1 (1) 65 IFDUM2 (1) 68 IUL (1) 71 IFYT (1) 74 IUZR (1) 77 IFLR (1) 80 IUPHTF (1) 83 IUMODM (1) 86 IUPHT (1) 89 IFQT (1) 92 IUPH (1) 95 IFINCM (1)

**KLUES** 24

**CLIST** 11

**CTABLE** 8

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	FTN 4 . 8+577
CTSHV	2	3 NCOLS (1) 6 NPAGEA (1) 0 LTSHV (1) 0 LKUEV (1) 0 SFMAT (25000)	4 NCOLST (1) 7 ITAPET (1) 1 TSHV (1) 1 KLUEV (20)
CLUEV	21		
CPMASS	25000		
CTAPES	50	0 ITAPES (50)	
COMRWP	3	0 ITAPER (1)	1 ITAPEW (1)
MATRIX	45	0 ISETUP (45)	
REPORT	1	0 KREPOR (1)	
FILE	20	0 IPQS (20)	2 ITAPEP (1)

STATISTICS  
 PROGRAM LENGTH 1106B 582  
 CM LABELED COMMON LENGTH 61303B 25283  
 52000B CM USED

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5 KTABLO (1)

OPT = 1

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173      READ MASS MATRIX FROM TAPE
C
C      CALL TITLES (2)
C      IPOS(ISCR)=IFCOM
C      CALL READMA (ISCR,IROW,BUFFER,NAME)
C
C      IPOS(ISCR)=IFCOM+1
C      NIX = 0
C      GOTO 13
C
C      11 CONTINUE
C      IPOS(ISCR)=IFCOM+1
C      NIX = 0
C
C      STIFFNESS PROBLEM
C
C      READ STIFFNESS MATRIX FROM TAPE
C
C      CALL COMPACK (IROW,IROWD)
C
C      13 CONTINUE
C      CALL PROGNA (4H(EIG, 4HEN ))
C      CALL TITLES (2)
C
C      C FORM CHOLESKY DECOMPOSITION (L-MATRIX)
C      C 1. USE OF STIFFNESS MATRIX (KMATV=1) REQUIRES THE CHOLESKY
C      C 2. DECOMPOSITION OF THE STIFFNESS MATRIX WHICH IS STORED IN 'A'.
C      C 3. USE OF THE FLEXIBILITY MATRIX (KMATV=2) REQUIRES THE CHOLESKY
C      C DECOMPOSITION OF THE MASS MATRIX WHICH IS STORED IN 'A'.
C
C      CALL FUTILE (A, IROW, NIX)
C      12 IF (NIX) 2,3,4
C          2 WRITE(1TAPENW,41) NAMER
C          GOTO 500
C          4 WRITE(1TAPENW,42)
C
C      3 CONTINUE
C
C      14 IF (KMATV EQ.2) GO TO 14
C
C      STIFFNESS PROBLEM
C
C      STORE A MATRIX WHICH IS SPLIT OF STIFFNESS ON TAPE
C      THE ELEMENTS OF SPLIT ARE WRITTEN OUT A ROW AT A TIME
C      (ONLY LOWER TRIANGLE ELEMENTS PRESENT)
C      NFIL = IPOS(ISCR)
C      CALL PUDLAB (8HE1GENO1 ,ISCR,NAME2,NFIL,IROW)
C      JCL = 1
C      DO 140 I=1,IROW
C          JCU = JCL + I - 1
C          CALL RITVEC (JCL, JCU, BUFFER, ISCR)
C
C      215
C
C      216
C
C      217
C
C      218
C
C      219
C
C      220
C
C      221
C
C      222
C
C      223
C
C      224
C
C      225
C
C      226
C
C      227
C
C

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140 CONTINUE          230          EIGEN      230
      CALL DCLOSE (ISCR)          EIGEN      231
      C FORM THE COEFFICIENT MATRIX FOR THE STANDARD EIGENVALUE PROBLEM
      C
      C FORM THE COEFFICIENT MATRIX THROUGH THE PRODUCT OF - (INVERSE OF L)
      C TIMES (MASS) TIMES (INVERSE OF L TRANSPOSE)
      C NOTE THAT THE COEFFICIENT MATRIX MUST BE IN COLUMN SORT FOR USE IN
      C THE SYMEIG ROUTINE.
      C THE SWAP ROUTINE IS BEING CALLED AT THE END OF THE COEFFICIENT
      C MATRIX CALCULATION IN ORDER TO ARRANGE THE COEFFICIENT MATRIX
      C IN COLUMN SORT.
      C
      C FIRST READ MASS MATRIX INTO CORE          235          EIGEN      235
      C IPOS (ISCR)=IFCOM
      C CALL READMA (ISCR, IROW, BUFFER, NAME)          EIGEN      236
      C
      C NOW FORM MATRIX PRODUCT          245          EIGEN      237
      C
      C IPOS (ISCR)=IFCOM+1          246          EIGEN      238
      NFIL = IPOS (ISCR)
      CALL GEDLAB (BHEIGEN O1, ISCR, NAME, NFIL, IROWS, JCOLS)          EIGEN      239
      DO 10 I=1,IROW          247          EIGEN      240
      JCOL = I          EIGEN      241
      CALL GETROW (ISCR, 1, Q, JCOL)
      X=-Q(I)
      Q(I)= -1.          248          EIGEN      242
      DO 20 J=1,1          249          EIGEN      243
      20 Q(J)=Q(J)/X          250          EIGEN      244
      10 CALL DAGGER (A,IROW,Q,I,A(INDEX))
      CALL DCLOSE (ISCR)
      CALL SWAP (A,IROW)
      GOTO 16          251          EIGEN      245
      C
      C 14 CONTINUE          255          EIGEN      246
      C FLEXIBILITY MATRIX APPROACH.
      C FORM THE COEFFICIENT MATRIX THROUGH THE PRODUCT OF - (L TRANSPOSE)
      C TIMES (FLEXIBILITY) TIMES (L).
      C NOTE THAT THE COEFFICIENT MATRIX MUST BE IN COLUMN SORT FOR USE IN
      C THE SYMEIG ROUTINE.
      C
      C WRITE L-MATRIX OUT IN ROW SORT ON I/O UNIT          260          EIGEN      247
      NFIL = IPOS (ISCR)
      CALL PUDLAB (BHEIGEN O2, ISCR, NAME2, NFIL, IROW, IROW)
      JCLO = 1          265          EIGEN      248
      DO 141 I=1,IROW          270          EIGEN      249
      JCU = JCLO + I - 1          275          EIGEN      250
      CALL RITVEC (JCL, JCU, BUFFER, ISCR)
      JCL = JCLO + 1          280          EIGEN      251
      141 CONTINUE          285          EIGEN      252
      CALL DCLOSE (ISCR)
      IPOS (ISCR)=IFCOM+2          286          EIGEN      253
      C

```

SUBROUTINE RITVEC

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PAGE

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1 C SUBROUTINE RITVEC ( JCL, JCU, BUFFER, ISCR )

C C DIMENSION A(25000)  
C DIMENSION BUFFER( 1 )

C C COMMON /CPMASS/ A  
DO 151 J=JCL,JCU  
JB = J - JCL + 1  
151 BUFFER(JB) = A(J)  
JCOL = JCU - JCL + 1  
CALL PUTROW ( ISCR, 1, BUFFER, JCOL )  
RETURN  
END

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 RITVEC	1	14
VARIABLES	SN TYPE	RELOCATION
O A	REAL	ARRAY CPMASS
O BUFFER	REAL	ARRAY F.P.
O ISCR	INTEGER	F.P.
J	INTEGER	REFS
36 J	INTEGER	REFS
37 JB	INTEGER	REFS
O JCL	INTEGER	REFS
40 JCOL	INTEGER	REFS
O JCU	INTEGER	REFS
EXTERNALS	TYPE	ARGS REFERENCES
PUTROW		4 13
STATEMENT LABELS		DEF LINE REFERENCES
O 151		11 9
LOOPS	LABEL INDEX	FROM-TO LENGTH PROPERTIES
13 151	J	9 11 4B INSTACK
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CPMASS	25000	O A (25000)
STATISTICS		
PROGRAM LENGTH		41B 33
CM LABELED COMMON LENGTH		60650B 25000
52000B CM USED		

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SUBROUTINE READMA		74/74	OPT=1	PROPERTIES			FTN 4.8+577
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	EXT REFS	NOT INNER	
17	105	J	13 20	25B			
35	100	K	17 19	4B	INSTACK		
COMMON BLOCKS		LENGTH	MEMBERS - BIAS NAME(LENGTH)				
CPMASS		25000	O A (25000)				
FILE		1	O IP05 (1)				
STATISTICS							
PROGRAM LENGTH			105B	69			
CM LABELED COMMON LENGTH			60651B	25001			
52000B CM USED							

```

1      SUBROUTINE READMA (ISCR, IROW, BUFFER, NAME)
2
3      C      DIMENSION A(25000)
4      C      DIMENSION BUFFER(1)
5      C      DIMENSION IPOS(1)
6      C      DIMENSION NAME(1)
7
8      C      COMMON /CPMASS/ A
9      C      COMMON /FILE/ IPOS
10     C      NFIL = IPOS(ISCR)
11     C      CALL GEDLAB (GHREADMA, ISCR, NAME, NFIL, IROW, IROW)
12     C      DO 105 J=1, IROW
13       IANS6 = (((J-1)*2+(J-1))/2) + 1
14       ILIM1 = IANS6 + J - 1
15       CALL GETROW (ISCR, 1, BUFFER, IROW)
16       DO 100 K=IANS6, ILIM1
17         KB = K - IANS6 + 1
18         A(K) = BUFFER(KB)
19       105 CONTINUE
20       CALL DCLOSE (ISCR)
21       RETURN
22     END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
3 READMA	1	22				
VARIABLES	SN TYPE	RELOCATION				
O A	REAL	ARRAY CPMASS	REFS 3	8	DEFINED 19	
O BUFFER	REAL	ARRAY F.P.	REFS 4	16	DEFINED 19	
71 IANS6	INTEGER		REFS 15	17	DEFINED 18	
72 ILIM1	INTEGER		REFS 17	15	DEFINED 15	
O IPOS	INTEGER	FILE F.P.	REFS 5	9	DEFINED 11	
O IROW	INTEGER		REFS 2*12	13	DEFINED 16	
O ISCR	INTEGER	F.P.	REFS 11	12	DEFINED 16	
70 J	INTEGER		REFS 2*14	15	DEFINED 13	
73 K	INTEGER		REFS 18	19	DEFINED 17	
74 KB	INTEGER		REFS 19	18	DEFINED 18	
O NAME	INTEGER	ARRAY F.P.	REFS 6	12	DEFINED 12	
67 NFIL	INTEGER		REFS 12	11	DEFINED 11	
EXTERNALS	TYPE	ARGS REFERENCES				
DCLOSE		1 21				
GEDLAB		6 12				
GETROW		4 16				
STATEMENT LABELS	DEF LINE	REFERENCES				
O 100	19	17				
O 105	20	13				



SUBROUTINE EIGEN

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LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS	EXT REFS	NOT INNER
256	150	1	295 299	12B				
306	70	1	308 354	122B	INSTACK			
317	73	II	311 312	2B				
326	77	J1	319 322	12B		EXT REFS		
341	71	J	324 339	32B		EXT REFS		NOT INNER
346	72	K	330 336	13B	OPT			
374	76	J	344 350	21B		EXT REFS		
435	19	I	362 370	24B	INSTACK			
452	240	J	367 369	4B	INSTACK			
473	300	I	380 381	3B				
500	310	I	382 383	7B		EXT REFS		
512	315	I	385 396	27B		EXT REFS		
547	30	I	403 411	27B		EXT REFS		NOT INNER
562	250	J	406 408	4B	INSTACK			
607	220	I	429 436	23B		EXT REFS		NOT INNER
622	210	J	433 435	4B	INSTACK			
650	50	I	446 450	15B		EXT REFS		
COMMON BLOCKS								
CPMASS								
COMRWP	3		25000		O A (25000)		1 ITAPEW (1)	
DSRN	1				O ITAPER (1)			
FILE	1				O JSETUP (1)			
REPORT	1				O IPDS (1)			
CTSHV	2				O KREPOR (1)			
CLIST	11				O LTHSHV (1)			
CTABLE								
CFILES								
CTITLE	2		25000		O A (25000)		2 ITAPEP (1)	
FREAKS	37				O KFILE (1)			
PLACES	40				O LITTLE (1)			
MEMBERS - BIAS NAME(LENGTH)								
O A (25000)								
O ITAPER (1)								
O JSETUP (1)								
O IPDS (1)								
O KREPOR (1)								
O LTHSHV (1)								
O KOUNT (1)								
O LINEST (1)								
O NPAGE (1)								
O KOUNTH (1)								
O KTABLE (1)								
O NCOLS (1)								
O NCOLST (1)								
O NCNT (1)								
O NPAGEA (1)								
O KFILE (1)								
O LITTLE (1)								
O FREQ (40)								
O IUIN1 (1)								
O IUDOUT2 (1)								
O IUGD03 (1)								
O IFSCR (1)								
O IFSS3 (1)								
O IFS4 (1)								
O IUPR (1)								
O IUV (1)								
O IUMIN2 (1)								
O IUGO1 (1)								
O IUGO4 (1)								
O IFS1 (1)								
O IFS2 (1)								
O IFS4 (1)								
O IFA (1)								
O IUM (1)								
O IUMEMN (1)								
O IUSTFN (1)								
O IUFKS (1)								
O IUDESO (1)								
O IUMDBI (1)								
O IUBALI (1)								
O IUDESI (1)								
O IUMEMO (1)								
O IUBT (1)								
O IFBT (1)								
O IFDESN (1)								
O IUMD (1)								
O IFMEMF (1)								
O IUMEM (1)								
O IUMDB (1)								
O IUMDF (1)								
O IUMES (1)								
O IUMESF (1)								
O IWT (1)								
O IWTI (1)								
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O IWTI (1)								

EXTERNALS	TYPE	ARGS	REFERENCES
SYMEIG		10	379 404
TITLES		1	174 196
TRIEQ		5	448

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE REFERENCES
ABSF	REAL	1	SF 126
MAXOF	INTEGER	2	SF 128
MINOF	INTEGER	2	SF 129
SQRTF	REAL	1	SF 127

STATEMENT LABELS	TYPE	ARGS	DEF LINE REFERENCES
0 2	INACTIVE		207 206

114 3			212 206
112 4			209 206
51 9			161 159
0 10			260 253
67 11			183 169
0 12	INACTIVE		206 180
77 13			194 180
213 14			266 215
463 16			378 263
0 19			370 362
0 20			259 258
0 30			411 403
1233 41	FMT		457 207
1241 42	FMT		458 209
0 50			450 446
1245 51	FMT		459 390
1252 56	FMT		460 394
0 70			354 308
0 71			339 324
0 72			336 330
0 73			312 311
353 74			334 331
356 75			335 333
0 76			350 344
0 77			322 319
404 78			348 346
0 140			229 225
0 141			282 278
0 150			299 295
0 210			435 433
0 220			436 429
0 240			369 367
0 250			408 406
0 300			381 380
0 310			383 382
530 312			393 389
0 315			396 385
671 500			453 208
1255 1000	FMT		461 160

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
127	140	1	225 229	11B	EXT REFS
160	10	1	253 260	25B	EXT REFS NOT INNER
172	20	1	258 259	3B	INSTACK
224	111	1	278 287	41D	EVT DEFC



SUBROUTINE EIGEN		74/74 OPT=1		FTN 4.8+577		85/01/23 . 08 . 10 . 44		PAGE 12	
VARIABLES	SN	TYPE	RELOCATION						
120	IUPHTF	INTEGER	PLACES	REFS	98	338	345	346	346
17	IUPR	INTEGER	PLACES	REFS	98	407	408	434	435
132	IUQ	INTEGER	PLACES	REFS	98	367	406	433	435
22	IUQA	INTEGER	PLAYFF	REFS	115	228	368	407	434
24	IUQAT	INTEGER	PLAYFF	REFS	115	279	280	281	298
130	IUQT	INTEGER	PLAYFF	REFS	98	435	436	407	277
10	IUSCR	INTEGER	PLAYFF	REFS	98	436	224	228	228
16	IUSLT	INTEGER	PLAYFF	REFS	115	437	334	338	345
4	IUSLT1	INTEGER	PLAYFF	REFS	115	368	369	408	434
26	IUSTFN	INTEGER	PLAYFF	REFS	98	324	344	406	433
62	IUSTFO	INTEGER	PLAYFF	REFS	98	433	434	433	433
10	IUTPGT	INTEGER	PLAYFF	REFS	98	258	324	367	433
74	IUWT	INTEGER	PLAYFF	REFS	98	226	227	228	228
46	IUWT1	INTEGER	PLAYFF	REFS	98	430	434	436	434
22	IUY	INTEGER	PLAYFF	REFS	98	281	297	428	436
106	IUYT	INTEGER	PLAYFF	REFS	98	255	352	366	410
110	IUZ	INTEGER	PLAYFF	REFS	98	351	365	409	432
112	IUZR	INTEGER	PLAYFF	REFS	98	361	427	443	431
1304	J	INTEGER	PLAYFF	REFS	98	254	252	280	298
1317	JB	INTEGER	REFS	REFS	331	369	407	406	406
1275	JCL	INTEGER	REFS	REFS	331	408	435	368	406
1301	JCOLS	INTEGER	REFS	REFS	331	435	436	368	406
1277	JCU	INTEGER	REFS	REFS	331	436	436	368	406
1266	JSCR	INTEGER	REFS	REFS	331	436	447	447	452
0	JSETUP	INTEGER	DSRN	DSRN	332	332	334	335	330
1307	J1	INTEGER	ARRAY	ARRAY	78	87	319	335	330
1311	K	INTEGER	CLIST	CLIST	331	332	334	335	330
7	KBPAGE	INTEGER	CFILES	REFS	91	91	91	91	91
0	KFILES	INTEGER	KLUFF	REFS	95	119	143	144	144
0	KFREE	INTEGER	CLIST	REFS	91	226	279	296	330
4	KLABEL	INTEGER	F.P.	REFS	146	147	153	169	215
0	KMATV	INTEGER	DEFINED	REFS	68	68	384	387	395
0	KOUNT	INTEGER	CLIST	REFS	91	91	386	389	395
11	K\$JUNTH	INTEGER	CLIST	REFS	91	91	386	389	395
12	KOUNT1	INTEGER	CLIST	REFS	91	91	387	392	395
1	KPAGE	INTEGER	REPORT	REFS	91	91	91	91	91
0	KREPOR	INTEGER	CTABLE	REFS	93	93	93	93	93
0	KTABLE	INTEGER	CTABLE	REFS	93	93	93	93	93
5	KTABLO	INTEGER	CTABLE	REFS	91	91	91	91	91
5	KTPAGE	INTEGER	CLIST	REFS	448	448	387	387	387
1270	L	INTEGER	CLIST	REFS	91	91	388	386	386
1320	LEFT	INTEGER	CLIST	REFS	91	91	384	386	386
2	LINES	INTEGER	CLIST	REFS	91	91	388	386	386
10	LINESG	INTEGER	CLIST	REFS	91	91	388	386	386
3	LINEST	INTEGER	CLIST	REFS	91	91	388	386	386
0	LTITLE	INTEGER	CLIST	REFS	91	91	388	386	386

SUBROUTINE EIGEN				74/74	OPT=1	
VARIABLES	SN	TYPE	RELOCATION	F.P.		
0 ISCR		INTEGER				
2 ITAPER	2	INTEGER				
0 ITAPER	0	INTEGER				
7 ITAPER	7	INTEGER				
1 ITAPW	1	INTEGER				
20 IUA	20	INTEGER				
66 IUADD	66	INTEGER				
40 IUDADI	40	INTEGER				
32 IUB	32	INTEGER				
70 IUBAL	70	INTEGER				
42 IUBLAL	42	INTEGER				
116 IUBR	116	INTEGER				
52 IUBT	52	INTEGER				
16 IUCD	16	INTEGER				
72 IUDSF	72	INTEGER				
44 IUDESI	44	INTEGER				
54 IUDESN	54	INTEGER				
34 IUDESO	34	INTEGER				
20 IUDLT	20	INTEGER				
2 IUDLTI	2	INTEGER				
76 IUDUM1	76	INTEGER				
100 IUDUM2	100	INTEGER				
102 IUDUM3	102	INTEGER				
4 IUGO1	4	INTEGER				
5 IUGO2	5	INTEGER				
6 IUGO3	6	INTEGER				
7 IUGO4	7	INTEGER				
140 IUIINCK	140	INTEGER				
136 IUIINCM	136	INTEGER				
0 IUIIN1	0	INTEGER				
1 IUIIN2	1	INTEGER				
30 IUKS	30	INTEGER				
104 IUL	104	INTEGER				
114 IULR	114	INTEGER				
56 IUMD	56	INTEGER				
64 IUMDOB	64	INTEGER				
36 IUMDB1	36	INTEGER				
0 IUMDOFF	0	INTEGER				
60 IUMEMF	60	INTEGER				
24 IUMEMN	24	INTEGER				
50 IUMEMO	50	INTEGER				
124 IUMODK	124	INTEGER				
122 IUMODM	122	INTEGER				
14 IUMPL	14	INTEGER				
6 IUMPLI	6	INTEGER				
2 IUOUT1	2	INTEGER				
3 IUOUT2	3	INTEGER				
12 IUPATF	12	INTEGER				
134 IUPH	134	INTEGER				
26 IUPHA	26	INTEGER				
30 IUPHAT	30	INTEGER				

SUBROUTINE EIGEN	74/74	OPT=1	RELOCATION	
VARIABLES	SN	TYPE		
105	IFL	INTEGER	PLACES	REFS 98
115	IFLR	INTEGER	PLACES	REFS 98
57	IFMD	INTEGER	PLACES	REFS 98
65	IFMDB	INTEGER	PLACES	REFS 98
37	IFMDBI	INTEGER	PLACES	REFS 98
1	IFMDF	INTEGER	PLAYFF	REFS 115
61	IFMEMF	INTEGER	PLAYFF	REFS 98
25	IFMEMN	INTEGER	PLAYFF	REFS 98
51	IFMEMO	INTEGER	PLAYFF	REFS 98
125	IFMODK	INTEGER	PLAYFF	REFS 98
123	IFMODM	INTEGER	PLAYFF	REFS 98
15	IFMPL	INTEGER	PLAYFF	REFS 115
7	IFMPLI	INTEGER	PLAYFF	REFS 115
13	IFPATF	INTEGER	PLAYFF	REFS 115
135	IFPH	INTEGER	PLAYFF	REFS 98
27	IFPHA	INTEGER	PLAYFF	REFS 115
31	IFPHAT	INTEGER	PLAYFF	REFS 115
127	IFPHT	INTEGER	PLAYFF	REFS 98
121	IFPHTF	INTEGER	PLAYFF	REFS 98
133	IFQ	INTEGER	PLAYFF	REFS 98
23	IFQA	INTEGER	PLAYFF	REFS 115
25	IFQAT	INTEGER	PLAYFF	REFS 115
131	IFQT	INTEGER	PLAYFF	REFS 98
11	IFSAR	INTEGER	PLAYFF	REFS 98
17	IFSLT	INTEGER	PLAYFF	REFS 115
5	IFSLTI	INTEGER	PLAYFF	REFS 115
27	IFSTFN	INTEGER	PLAYFF	REFS 98
63	IFSTFO	INTEGER	PLAYFF	REFS 98
12	IFS1	INTEGER	PLAYFF	REFS 98
13	IFS2	INTEGER	PLAYFF	REFS 98
14	IFS3	INTEGER	PLAYFF	REFS 98
15	IFS4	INTEGER	PLAYFF	REFS 98
11	IFTPGT	INTEGER	PLAYFF	REFS 115
75	IFWT	INTEGER	PLAYFF	REFS 98
47	IFWTI	INTEGER	PLAYFF	REFS 98
23	IFY	INTEGER	PLAYFF	REFS 98
107	IFYT	INTEGER	PLAYFF	REFS 98
111	IFZ	INTEGER	PLAYFF	REFS 98
113	IFZR	INTEGER	PLAYFF	REFS 98
1305	II	INTEGER	PLAYFF	REFS 98
1316	ILIM	INTEGER	REFS 367	311
1321	IN	INTEGER	REFS 406	364
1271	INDEX	INTEGER	REFS 409	DEFINED
			REFS 260	405
			REFS 151	379
			REFS 404	404
0	INDEX1	INTEGER	DEFINED 312	311
1267	INDIC8	INTEGER	REFS 405	DEFINED
0	IPOS	INTEGER	REFS 448	148
			REFS 77	222
			REFS 426	444
			REFS 245	250
			REFS 3*150	176
0	IROW	INTEGER	REFS 253	260
			REFS 296	297
			REFS 320	324
			REFS 364	2*379
			REFS 448	449
0	IRWD	INTEGER	REFS 191	304
1300	TDIMC	INTEGER	REFS 75	75

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SYMBOLIC REFERENCE MAP (R=3)		
NAME	DEF LINE	REFERENCES
Y POINTS	68	462
3 EIGEN		
TABLES	SN TYPE	RELOCATION CPMAS
3 A	REAL	ARRAY
2 BUFFER	REAL	ARRAY
3 FREQ	REAL	ARRAY
6 INTCOM	INTEGER	FREAK
5 IANS1	INTEGER	
2 IANS2	INTEGER	
7 IDFF	INTEGER	ARRAY
3 IDFV	INTEGER	ARRAY
1 IFA	INTEGER	PLACE
7 IFADD	INTEGER	PLACE
1 IFADDI	INTEGER	PLACE
3 IFB	INTEGER	PLACE
1 IFBAL	INTEGER	PLACE
3 IFBAL1	INTEGER	PLACE
7 IFBR	INTEGER	PLACE
3 IFBT	INTEGER	PLACE
5 IFCOM	INTEGER	PLACE
3 INFOSF	INTEGER	PLACE
5 IFDESI	INTEGER	PLACE
5 IFDESN	INTEGER	PLACE
5 IFDESO	INTEGER	PLACE
1 IFDLT	INTEGER	PLAYF
3 IFDLT1	INTEGER	PLAYF
7 IFDUM1	INTEGER	PLACE
1 IFDUM2	INTEGER	PLACE
3 IFDUM3	INTEGER	PLACE
1 IFILES	INTEGER	CFILE
1 IFINCK	INTEGER	PLACE
1 IFINCM	INTEGER	PLACE
7 IFINCR	INTEGER	PLACE

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INITE )	EIGEN	458		
)	EIGEN	459		
	EIGEN	460		
	EIGEN	461		
	EIGEN	462		
	EIGEN	463		
	EIGEN	464		
85	205	2 * 260	262	289
408	448	DEFINED	369	435
176	227	246	280	298
349	366	369	410	432
97	383	394	DEFINED	381
228	254	256	257	258
4 * 296	297	313	319	321
351	352	3 * 363	364	379
404	430	431	436	
253	278	295	308	362
403	429	446		380
365	367	368	DEFINED	363
	332	334		
			DEFINED	
178	184	245	250	284
144				417

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400 C  
C NFIL = IPOS (JSQR)  
CALL PUDLAB (BHEIGEN 05, JSQR, NAME5, NFIL, NROOTS, IROW)  
DO 30 I=1,NROOTS  
CALL SYMEIG (A, IROW, 1, NROOTS, Q, A (INDEX) .I. 1, IROW, 2)  
IN = INDEX1 + IROW  
DO 250 J=INDEX, IN  
JB = J - INDEX + 1  
250 BUFFER (JB) = A (J)  
JCOL = IN - INDEX + 1  
CALL PUTROW (JSQR, 1, BUFFER, JCOL)  
30 CONTINUE  
CALL DCLOSE (JSQR)  
C C RETURN TAPE ISCR TO POSITION  
415 C WHERE L MATRIX IS WRITTEN IN ROW SORT.  
C IPOS (ISCR) = IFCOM+1  
C C  
420 C READ THE L MATRIX FROM TAPE FOR USE IN THE TRANSFORMATION  
C OF THE EIGENVECTORS TO PHYSICAL COORDINATES.  
C (LOWER TRIANGLE ELEMENTS ONLY ARE PRESENT)  
C  
425 C NFIL = IPOS (ISCR)  
CALL GEDLAB (BHEIGEN 04, ISCR, NAME, NFIL, IROWS, JCOLS)  
JCL = 1  
DO 220 I=1,IROW  
JCU = JCL + I - 1  
JCOL = I  
CALL GETROW (ISCR, 1, BUFFER, JCOL)  
DO 210 J=JCL, JCU  
JB = J - JCL + 1  
210 A (J) = BUFFER (JB)  
220 JCCL = JCL + I  
CALL DCLOSE (ISCR)  
C C CALCULATE EIGEN VECTORS IN THE PHYSICAL COORDINATE SYSTEM AND STORE ON  
C  
440 C NFIL = IPOS (JSQR)  
CALL GEDLAB (BHEIGEN 05, JSQR, NAME, NFIL, IROWS, JCOLS)  
NFIL = IPOS (ISCR)  
CALL PUDLAB (BHEIGEN 06, ISCR, NAME3, NFIL, NROOTS, IROW)  
DO 50 I=1,NROOTS  
CALL GETROW (JSQR, 1, Q, IROW)  
CALL TRIEQ (A, Q, IROW, L, INDIC8)  
CALL PUTROW (ISCR, 1, Q, IROW)  
50 CONTINUE  
CALL DCLOSE (ISCR)  
CALL DCLOSE (JSQR)  
500 CONTINUE  
C C FORMATS  
445 C  
450 C  
455 C

EIGEN 401

EIGEN 402

EIGEN 403

EIGEN 404

EIGEN 405

EIGEN 406

EIGEN 407

EIGEN 408

EIGEN 409

EIGEN 410

EIGEN 411

EIGEN 412

EIGEN 413

EIGEN 414

EIGEN 415

EIGEN 416

EIGEN 417

EIGEN 418

EIGEN 419

EIGEN 420

EIGEN 421

EIGEN 422

EIGEN 423

EIGEN 424

EIGEN 425

EIGEN 426

EIGEN 427

EIGEN 428

EIGEN 429

EIGEN 430

EIGEN 431

EIGEN 432

EIGEN 433

EIGEN 434

EIGEN 435

EIGEN 436

EIGEN 437

EIGEN 438

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EIGEN 441

EIGEN 442

EIGEN 443

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EIGEN 445

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EIGEN 455

EIGEN 456

FIGFN 457

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PAGE
SUBROUTINE EIGEN      74/74    OPT=1          FTN 4.8+577   85/01/23. 08.10.44
C
C
345      DO 76 J=I,IROW
          NDOT1 = IROW - J + 1
          IF (J.EQ.I) GOTO 78
          CALL GETROW (ISCR, 1, BUFFER(J), NDOT1)
78      SUM = 0.0
          Q(J) = SCAPRO (QQ(J), BUFFER(J), SUM, NDOT1, 1, 1)
76      CONTINUE
          JCOL = IROW - I + 1
          CALL PUTROW (USCR, 1, Q(I), JCOL)
          CALL DCLOSE (ISCR)
70      CONTINUE
          CALL DCLOSE (USCR)
C
C
C READ THE COEFFICIENT MATRIX FROM TAPE FOR USE IN SYMEIG ROUTINE.
C
350      NFIL = IFS3
          CALL GEDLAB (8H EIGEN 03, JSCR, NAME, NFIL, IROWS, JCOLS)
          DO 19 I=1,IROW
          IANS1 = IROW*(I-1) - ((I-1)*(I-2)/2) + 1
          ILIM = IANS1 + IROW - I
          JCOL = ILIM - IANS1 + 1
          CALL GETROW (USCR, 1, BUFFER, JCOL)
          DO 240 J=IANS1,ILIM
              JB = J - IANS1 + 1
              240 A(J) = BUFFER(JB)
19      CONTINUE
          CALL DCLOSE (USCR)
C
C
C CALCULATE EIGENVALUES (Q(I)) AND FREQUENCIES (FREQ(I)).
C NOTE THAT AT THIS POINT THE COEFFICIENT MATRIX IS STORED IN A(I)
C IN COLUMN SORT.
C
355      C
360      16 CONTINUE
          CALL SYMEIG (A, IROW, 1, NROOTS, Q, A(INDEX), I, 1, IROW, 1)
          DO 300 I=1,NROOTS
300      FREQ(I) = 1.0/Q(I)
          DO 310 I=1 NROOTS
310      FREQ(I) = SQRTF (FREQ(I)*386.4)/6.28318
          KOUNT=LINE$ DO 315 I=1,NROOTS
315      LEFT=LINE$-KOUNT
          IF(LEFT.LT.2) KOUNT=LINE$
          CALL TITLES (2)
          IF(KOUNT.GT.KOUNTH) GO TO 312
          WRITE(ITAPEW,51)
          CALL PLB(1,1,ITAPEW)
          KOUNT=KOUNT+2
312      CONTINUE
          WRITE(ITAPEW,56) I, FREQ(I)
          KOUNT=KOUNT+2
315      CONTINUE
C
C
C CALCULATE EIGEN VECTORS IN THE TRANSFORMED COORDINATE SYSTEM
C
344      EIGEN
345      EIGEN
346      EIGEN
347      EIGEN
348      EIGEN
349      EIGEN
350      EIGEN
351      EIGEN
352      EIGEN
353      EIGEN
354      EIGEN
355      EIGEN
356      EIGEN
357      EIGEN
358      EIGEN
359      EIGEN
360      EIGEN
361      EIGEN
362      EIGEN
363      EIGEN
364      EIGEN
365      EIGEN
366      EIGEN
367      EIGEN
368      EIGEN
369      EIGEN
370      EIGEN
371      EIGEN
372      EIGEN
373      EIGEN
374      EIGEN
375      EIGEN
376      EIGEN
377      EIGEN
378      EIGEN
379      EIGEN
380      EIGEN
381      EIGEN
382      EIGEN
383      EIGEN
384      EIGEN
385      EIGEN
386      EIGEN
387      EIGEN
388      EIGEN
389      EIGEN
390      EIGEN
391      EIGEN
392      EIGEN
393      EIGEN
394      EIGEN
395      EIGEN
396      EIGEN
397      EIGEN
398      EIGEN
399      EIGEN

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C SINCE 'A' MATRIX IS SPLIT OF MASS. REARRANGE IN COLUMN SORT          287
C BEFORE STORING ON TAPE          EIGEN 288
C CALL SWAP (A, IROW)          EIGEN 289
C WRITE L-TRANSPOSE ON TAPE          EIGEN 290
C
C NFIL = IPPOS(ISCR)
C CALL PUDLAB (8HEIGEN 03,ISCR,NAME2,NFIL,IROW,IROW)          EIGEN 291
295 DO 150 I=1,IROW          EIGEN 292
JCU = I*IROW - ((I*I - I)/2)          EIGEN 293
JCL = JCU - IROW + I          EIGEN 294
CALL RITVEC (JCL,JCU,BUFFER,ISCR)          EIGEN 295
150 CONTINUE          EIGEN 296
CALL DCLOSE (ISCR)          EIGEN 297
C READ FLEXIBILITY MATRIX INTO CORE          EIGEN 298
C CALL COMPACK (IROW, IROWD)
C CALL PROGNA(4H(EIG,4HEN))
NFIL = IFSS3          EIGEN 299
CALL PUDLAB (8HEIGEN 04,JSCR,NAME4,NFIL,IROW,IROW)          EIGEN 300
DO 70 I=1,IROW          EIGEN 301
NFIL = IPPOS(ISCR)
CALL GEDLAB (8HEIGEN 02,ISCR,NAME,NFIL,IROW,IROW)          EIGEN 302
70 73 I=1,IROW          EIGEN 303
73 Q(I) = 0.
NDOT = IROW - I + 1          EIGEN 304
C READ A COLUMN OF L MATRIX INTO CORE: COLUMN LENGTH IS          EIGEN 305
C NDOT = IROW - I + 1 AND IS LOADED AT POSITION I          EIGEN 306
C OF BUFFER ARRAY          EIGEN 307
C
C DO 77 J1 = 1,I
C NDOTV = IROW - J1 + 1          EIGEN 308
C CALL GETROW (ISCR,1,BUFFER(I),NDOTV)          EIGEN 309
77 CONTINUE          EIGEN 310
C
C DO 71 J=1,IROW          EIGEN 311
C LOAD VECTOR Q FROM POSITION I WITH ELEMENTS OF FLEXIBILITY          EIGEN 312
C MATRIX (J,K)          EIGEN 313
C K GOING FROM I TO N          EIGEN 314
C FLEXIBILITY MATRIX IS STORED IN CORE IN ROW SORT          EIGEN 315
C (LOWER TRIANGLE ONLY)          EIGEN 316
C
C DO 72 K=1,IROW          EIGEN 317
C IF (K.GT.J) GOTO 74          EIGEN 318
320 IANS2 = (((J-1)*(J-1) + (J-1))/2) + K          EIGEN 319
GOTO 75          EIGEN 320
74 IANS2 = (((K-1)*(K-1) + (K-1))/2) + J          EIGEN 321
75 Q(K) = A(IANS2)          EIGEN 322
72 CONTINUE          EIGEN 323
SUM = 0.EO          EIGEN 324
325 QQ(J) = SCAPRO(Q(I),BUFFER(I),SUM,NDOT,1,1)          EIGEN 325
71 CONTINUE          EIGEN 326
C MULTIPLY EVERY ROW OF L-TRANSPOSE MATRIX BY ITH COLUMN          EIGEN 327
C OF PREVIOUS PRODUCT STORED IN QQ          EIGEN 328
330
335
340
341
342
343

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SUBROUTINE SYMEIG 74/74 OPT=1 FTN 4.8+577 85/01/23. 08. 10.44  
 GO TO (50,80). KSYMEI  
 50 CONTINUE  
 C  
 C CALCULATE EIGENVALUES  
 C  
 LD = 1 + M  
 LO = LD + M  
 LS = LO + M  
 LP = LS + M  
 LQ = LP + M  
 LR = LQ + M  
 CALL TFCRM(A,M,R(LD),R(LO),R(LS),R(LP))  
 EPS = AMIN1F(TOL,TOL1)  
 CALL STURM(M,INDEX,NUMBR,R(LD),R('0),R(LS),R(LP),R,EPS)  
 GO TO 300  
 C  
 80 CONTINUE  
 C  
 C CALCULATE EIGEN VECTORS  
 C  
 CALL QSVEC(A,R(LD),R(LO),R(LQ),R(LR),R(LS),M,ROOT,X(1,1),1)  
 ROOT = R(LS-1)  
 FPS = ROOT\*TOL2  
 K = LOW  
 DO 200 I = 1,KOUNT  
 ROOT = AMIN1F(ROOT-EPS,R(K))  
 CALL QSVEC(A,R(LD),R(LO),R(LP),R(LQ),R(LR),R(LS),M,ROOT,X(1,1),2)  
 200 K = K + 1  
 C  
 300 CONTINUE  
 RETURN  
 END  
 59 SYMEIG 59  
 60 SYMEIG 60  
 61 SYMEIG 61  
 62 SYMEIG 62  
 63 SYMEIG 63  
 64 SYMEIG 64  
 65 SYMEIG 65  
 66 SYMEIG 66  
 67 SYMEIG 67  
 68 SYMEIG 68  
 69 SYMEIG 69  
 70 SYMEIG 70  
 71 SYMEIG 71  
 72 SYMEIG 72  
 73 SYMEIG 73  
 74 SYMEIG 74  
 75 SYMEIG 75  
 76 SYMEIG 76  
 77 SYMEIG 77  
 78 SYMEIG 78  
 79 SYMEIG 79  
 80 SYMEIG 80  
 81 SYMEIG 81  
 82 SYMEIG 82  
 83 SYMEIG 83  
 84 SYMEIG 84  
 85 SYMEIG 85  
 86 SYMEIG 86  
 87 SYMEIG 87  
 88 SYMEIG 88  
 89 SYMEIG 89  
 90 SYMEIG 90  
 91 SYMEIG 91  
 92 SYMEIG 92  
 58 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.  
 59 SYMBOLIC REFERENCE MAP (R=3)  
 NTRY POINTS DEF LINE REFERENCES  
 3 SYMEIG 47 F.P. 90  
 VARIABLES SN TYPE RELOCATION REFERENCES  
 O A REAL ARRAY F.P. 49 70 86 DEFINED  
 224 EPS REAL 72 85 DEFINED  
 227 I INTEGER 86 DEFINED  
 O INDEX INTEGER 72 DEFINED  
 58 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.  
 59 SYMBOLIC REFERENCE MAP (R=3)  
 NTRY POINTS DEF LINE REFERENCES  
 3 SYMEIG 47 F.P. 90  
 VARIABLES SN TYPE RELOCATION REFERENCES  
 O A REAL ARRAY F.P. 49 70 86 DEFINED  
 224 EPS REAL 72 85 DEFINED  
 227 I INTEGER 86 DEFINED  
 O INDEX INTEGER 72 DEFINED  
 58 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.  
 59 SYMBOLIC REFERENCE MAP (R=3)  
 NTRY POINTS DEF LINE REFERENCES  
 3 SYMEIG 47 F.P. 90  
 VARIABLES SN TYPE RELOCATION REFERENCES  
 O A REAL ARRAY F.P. 49 70 86 DEFINED  
 224 EPS REAL 72 85 DEFINED  
 227 I INTEGER 86 DEFINED  
 O INDEX INTEGER 72 DEFINED

ROUTINE	SYMEIG	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE
VARIABLES			RELOCATION			3
0 KOUNT	INTEGER	F.P.	REFS	84	DEFINED	47
0 KSYNEI	INTEGER	F.P.	REFS	58	DEFINED	47
216 LD	INTEGER	REFS	REFS	65	70	86
217 LO	INTEGER	DEFINED	DEFINED	64	70	86
0 LOW	INTEGER	REFS	REFS	66	70	86
221 LP	INTEGER	DEFINED	DEFINED	65	72	86
222 LQ	INTEGER	REFS	REFS	67	70	86
223 LR	INTEGER	REFS	REFS	69	80	86
220 LS	INTEGER	REFS	REFS	80	86	86
0 M	INTEGER	DEFINED	DEFINED	67	70	86
0 MID	INTEGER	REFS	REFS	67	72	86
3 MINUS2	INTEGER	CVIBRA	REFS	66	65	68
0 NUMBR	INTEGER	F.P.	REFS	64	65	69
0 R	REAL	F.P.	REFS	72	80	86
225 ROOT	REAL	CVIBRA	REFS	50	50	70
0 TOL	REAL	CVIBRA	REFS	52	52	86
1 TOL1	REAL	CVIBRA	REFS	49	49	86
2 TOL2	REAL	CVIBRA	REFS	47	47	86
0 X	REAL	F.P.	REFS	80	82	86
EXTERNALS	TYPE	ARGS	REFERENCES	47	47	86
QSVEC		11	80	52	52	86
STURM		9	72	71	71	86
TFORM		6	70	50	50	86
INLINE FUNCTIONS	TYPE	ARGS	REFERENCES	5*72	6*80	86
AMIN1	REAL	0 INTRIN	DEF LINE REFERENCES	4*70	81	85
AMIN1F	REAL	2 SF	71	47	85	86
STATEMENT LABELS		DEF LINE REFERENCES				
17 50		59	58			
61 80		75	58			
0 200		87	84			
141 300		89	73			
LOOPS	LABEL	INDEX	FROM-TO LENGTH PROPERTIES EXT REFS			
111 200	I	84 87	30B			
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)				
CVIBRA	4	O TOL (1)				
		3 MINUS2 (1)				
STATISTICS						
PROGRAM LENGTH						
CM LABELED COMMON LENGTH	244B	164				
52000B CM USED	4B	4				

2 TOL2 (1)

OPT = 1

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```

1      C45700. SUB. TFORM
C      C***** TFORM
C***** C***** TFORM
C***** C*** SUBROUTINE
C***** C*** COMPUTER VERSION *****
C***** C*** IBM ... AS IS.
C***** C*** CDC ... AS IS.
C***** C*** OBJECTIVE *****
C***** C*** A LOWER TRIANGULAR MATRIX OF THE STANDARD EIGENVALUE PROBLEM IS
C***** C*** REDUCED TO A TRI-DIAGONAL FORM USING THE HOUSEHOLDER METHOD.
C***** C*** INPUT/OUTPUT *****
C***** C*** SUMMARY OF SYMBOLS *****
C***** C*** ERROR MESSAGES *****
C***** C*** NONE.
C***** C*** SUBROUTINE TFORM(A,N,D,O,S,P)
C***** C*** DIMENSION A(1),D(1),O(1),S(1)
C      C FUNCTION DEFINITION
C      C   AMAX(X,Y) = AMAX(X,Y)
C      C   AMIN(X,Y) = AMIN(X,Y)
C      C   SQRT(X) = SQRT(X)
C
C      C   BL = 0,
C      C   BU = 0,
C      C   OLD = 0,
C      C   D(1) = A(1)
C      C   K1K1 = 1
C      C   N1 = N - 1
C      C   DO 230 K = 1,N1
C      C   KP1 = K + 1
C      C   KK = K1K1
C      C   KKP1 = KK + 1
C      C   NK = N - K
C      C   KN = KK + NK
C      C   K1K1 = KN + 1
C      C   SUM = 0.
C      C   DO 100 KJ = KKP1,KN
C      C   SUM = SUM + A(KJ)*A(KJ)
C      C   S(K) = SUM
C      C   RHO = D(K) + RHO
C      C   TFORM = TFORM + RHO
C
C      20      TFORM = TFORM + RHO
C      21      TFORM = TFORM + RHO
C      22      TFORM = TFORM + RHO
C      23      TFORM = TFORM + RHO
C      24      TFORM = TFORM + RHO
C      25      TFORM = TFORM + RHO
C      26      TFORM = TFORM + RHO
C      27      TFORM = TFORM + RHO
C      28      TFORM = TFORM + RHO
C      29      TFORM = TFORM + RHO
C      30      TFORM = TFORM + RHO
C      31      TFORM = TFORM + RHO
C      32      TFORM = TFORM + RHO
C      33      TFORM = TFORM + RHO
C      34      TFORM = TFORM + RHO
C      35      TFORM = TFORM + RHO
C      36      TFORM = TFORM + RHO
C      37      TFORM = TFORM + RHO
C      38      TFORM = TFORM + RHO
C      39      TFORM = TFORM + RHO
C      40      TFORM = TFORM + RHO
C      41      TFORM = TFORM + RHO
C      42      TFORM = TFORM + RHO
C      43      TFORM = TFORM + RHO
C      44      TFORM = TFORM + RHO
C      45      TFORM = TFORM + RHO
C      46      TFORM = TFORM + RHO
C      47      TFORM = TFORM + RHO
C      48      TFORM = TFORM + RHO
C      49      TFORM = TFORM + RHO
C      50      TFORM = TFORM + RHO
C
C      55      TFORM = TFORM + RHO

```

SUBROUTINE TFORM 74/74 OPT=1

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```

BL = AMIN1F(BL,D(K)-RAD)
BU = AMAX1F(BU,D(K)+RAD)
TF (K - N1) 120.,230.,230
120 OLD = RHO
IF (A(KKP1)) 140, 140, 130
130 RHO = -RHO
140 D(K) = RHO
IF (SUM) 150.,230.,150
150 A(KKP1) = A(KKP1) - RHO
RHO = 1. / (RHO*A(KKP1))
A(KK) = RHO
IJ = KK
DO 160 J = KP1,N
IJ = IJ + 1
D(IJ) = A(IJ)
160 D(J) = O;
II = KIK1
NI = NK
DO 190 I = KP1,N
D(I) = D(I) + A(II)*O(I)
IJ = II
II = II + NI
NI = NI - 1
IF (NI) 170, 190, 170
170 X = O(I)
DO 180 J = I,N1
IJ = IJ + 1
D(IJ+1) = D(J+1) + A(IJ)*X
180 D(I) = D(I) + A(IJ)*O(J+1)
190 D(I) = D(I) * RHO
SUM = O;
DO 200 I = KP1,N
200 SUM = SUM + D(I)*O(I)
TAU = RHO * SUM * .5
DO 210 I = KP1,N
210 D(I) = D(I) + TAU*D(I)
II = KIK1
NI = NK
DO 220 I = KP1,N
RHO = D(I)
TAU = O(I)
IJ = II
II = II + NI
NI = NI - 1
DO 220 J = I,N
A(IJ) = A(IJ) + RHO*D(J) + TAU*D(U)
220 IJ = IJ + 1
230 D(K+1) = A(K1K1)
O(N1) = A(KKP1)
O(N) = AMIN1F(BL,D(N)-RHO)
S(N) = AMAX1F(BU,D(N)+RHO)
C RETURN
END
100
105
110

```

SUBROUTINE TFORM 74/74 OPT=1

FTN 4.8+577

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## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS 3 TFORM	DEF LINE 29	REFERENCES 110						
VARIABLES O A	SN TYPE REAL	ARRAY F.P.	RELOCATION F.P.	REFS 77	42 86 66 103 103	2*54 103 68 107 39	62 106 58 40 40	67 72
233 BL	REAL		DEFINED	29	66	103	106	
234 BU	REAL		REFS	58	68			
O D	REAL	ARRAY F.P.	REFS	59	108 58 31	DEFINED DEFINED DEFINED	59 77 103	58 86 86
256 I	INTEGER		DEFINED	29	97 98 77 78 74	DEFINED DEFINED DEFINED DEFINED DEFINED	97 79 94 94 100	87 87 87
254 II	INTEGER		REFS	93	105 105 93 93 93	105 42 42 73 73	77 77 77 77	86 86 86 86
252 IJ	INTEGER		REFS	97	98 98 98 98 98	98 102 102 102 102	83 2*86 2*86 2*86 2*86	2*90 2*90 2*90 2*90
253 J	INTEGER		REFS	97	71 71 71 72 72	72 72 72 73 73	84 84 84 2*85 2*85	99 99 99 86 2*103
240 K	INTEGER		REFS	105	105 105 105 105 105	105 46 46 46 46	55 49 49 55 55	104 104 104 104 104
247 KJ	INTEGER		REFS	105	45 45 45 45 45	45 2*54 2*54 2*54 2*54	53 53 53 53 53	3*93 3*93 3*93 3*93 3*93
242 KK	INTEGER		REFS	105	48 48 48 48 48	48 48 48 48 48	50 50 50 50 50	96 96 96 96 96
243 KKP1	INTEGER		REFS	105	53 53 53 53 53	53 53 53 53 53	68 68 68 68 68	92 92 92 92 92
245 KN	INTEGER		REFS	105	62 62 62 62 62	62 62 62 62 62	2*66 2*66 2*66 2*66 2*66	106 106 106 106 106
241 KP1	INTEGER		REFS	105	67 67 67 67 67	67 67 67 67 67	69 69 69 69 69	47 47 47 47 47
236 K1K1	INTEGER		REFS	105	70 70 70 70 70	70 70 70 70 70	89 89 89 89 89	96 96 96 96 96
C N	INTEGER		REFS	105	76 76 76 76 76	76 76 76 76 76	92 92 92 92 92	101 101 101 101 101
255 NJ	INTEGER		REFS	105	80 80 80 80 80	80 80 80 80 80	81 95 95 95 95	96 96 96 96 96
244 NK	INTEGER		REFS	105	85 85 85 85 85	85 85 85 85 85	101 101 101 101 101	98 98 98 98 98
237 N1	INTEGER		REFS	105	90 90 90 90 90	90 90 90 90 90	95 95 95 95 95	44 44 44 44 44
O O	REAL	*UNUSED	REFS	105	95 95 95 95 95	95 95 95 95 95	106 106 106 106 106	44 44 44 44 44
235 OLD	REAL		REFS	105	103 103 103 103 103	103 103 103 103 103	61 61 61 61 61	107 107 107 107 107
O P	REAL		REFS	105	107 107 107 107 107	107 107 107 107 107	64 64 64 64 64	107 107 107 107 107
251 RAD	REAL		REFS	105	107 107 107 107 107	107 107 107 107 107	65 65 65 65 65	91 91 91 91 91
250 RHO	REAL		REFS	105	107 107 107 107 107	107 107 107 107 107	90 90 90 90 90	98 98 98 98 98
0 S	REAL	ARRAY F.P.	REFS	105	107 107 107 107 107	107 107 107 107 107	108 108 108 108 108	56 56 56 56 56
246 SUM	REAL	ARRAY F.P.	REFS	105	107 107 107 107 107	107 107 107 107 107	108 108 108 108 108	63 63 63 63 63
260 TAU	REAL		REFS	105	107 107 107 107 107	107 107 107 107 107	91 91 91 91 91	91 91 91 91 91
257 X	REAL		REFS	105	107 107 107 107 107	107 107 107 107 107	91 91 91 91 91	98 98 98 98 98
EXTERNALS SORT	REAL	TYPE REAL	ARG 1 LIBRARY	REFERENCES 56	85 85 85 85 85	85 85 85 85 85	82 82 82 82 82	68 68 68 68 68

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
AMAX1	REAL	0 INTRIN	59	108
AMAX1F	REAL	2 SF	59	108
AMIN1	REAL	0 INTRIN	58	107
AMIN1F	REAL	2 SF	58	107
SQRTF	REAL	1 SF	37	56

## STATEMENT LABELS

		DEF LINE	REFERENCES
0	100	54	53
0	120	61	60
0	130	63	62
53	140	64	2*62
0	150	66	2*65
0	160	73	70
0	170	82	2*81
0	180	86	83
126	190	87	81
0	200	90	89
0	210	93	92
0	220	104	96
207	230	105	45

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
15	230	K	45 105	177B	EXT REFS NOT INNER
27	100	KJ	53 54	3B	INSTACK
71	160	J	70 73	3B	INSTACK
101	190	I	76 87	31B	NOT INNER
117	180	J	83 86	6B	INSTACK
137	200	I	89 90	4B	INSTACK
152	210	I	92 93	3B	INSTACK
162	220	I	96 104	25B	NOT INNER
176	220	J	102 104	5B	INSTACK

STATISTICS  
PROGRAM LENGTH  
52000B CM USED

3268 214

```

2      STORM
3      STORM
4      STORM
5      STORM
C***** SUBROUTINE *****
C*** COMPUTER VERSION *****
C----- IBM ... AS IS.
C----- CDC ... AS IS.
C*** OBJECTIVE *****
C----- APPLY BISECTION TECHNIQUE FOR THE ROOTS
C*** INPUT/OUTPUT *****
C----- C SUMMARY OF SYMBOLS *****
C----- C ERROR MESSAGES *****
C----- C NONE.
C----- C SUBROUTINE STURM (N,LIM1,NUMB,D,OFFD,SEC,PFFD,SIGMA,EPS)
C----- C DIMENSION D(1),OFFD(1),SEC(1),SIGMA(1),PFFD(1)
C----- C FUNCTION DEFINITION
C----- ABSF(X) = ABS(X)
C----- AMAX1F(X,Y) = AMAX1(X,Y)
C----- DATA HALF / .5/
C----- BL = OFFD(N)
C----- BU = SEC(N)
C----- LIM2 = LIM1 + NUMB - 1
C----- CALL PREP(N,D,SEC,ROOT,LORD,1)
C----- N1 = N - 1
C----- IF (N1) 16,200,200
C----- TOL = AMAX1F(-BL,BU)
C----- OFFD(N) = TOL
C----- TOL = TOL * AMAX1F(1.E-15,EPS)
C----- DO 2 I = LIM1,LIM2
C----- SIGMA(I) = BL
C----- 2 PFFD(I) = BU
C----- LORD = 0
C----- L = LIM1 - 1
C----- RUTE = 1.E20
C----- GO TO 3
C----- 300 DO 400 I = K,L
C----- 400 SIGMA(I) = I + 1
C----- 55 3 K = I + 1

```

```

        IF (K - LIM2) 4.4.16
        4 BU = PFFD(K)
        ROOT = BU + HALF * (SIGMA(K) - BU)
        60 IF (K - L) 5.7.5
        DO 6 I = K,LIM2
        IF (BU - PFFD(I)) 7.6.7
        6 I = I
        7 IF (ABSF(ROOT - RUTE) - TOL) 300,300.8
        8 CALL PREP(N,D,SEC,ROOT,LORD,2)
        DO 11 I = K,L
        IF (I -LORD) 9.9.10
        9 SIGMA(I) = ROOT
        GO TO 11
        10 PFFD(I) = ROOT
        11 CONTINUE
        RUTE = ROOT
        GO TO 4
        C   16 RETURN
        END
    
```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
3 STURN	28	76	RELOCATION			
VARIABLES	SN	TYPE				
161 BL		REAL	REFS	45	49	DEFINED
162 BU		REAL	REFS	45	50	2*60
0 D		REAL	REFS	30	42	66
0 EPS		REAL	REFS	47	DEFINED	28
154 HALF		REAL	REFS	60	37	DEFINED
170 I		INTEGER	REFS	49	50	56
171 L		INTEGER	REFS	55	58	59
0 LIM1		INTEGER	REFS	71	DEFINED	57
163 LIM2		INTEGER	REFS	55	58	59
165 LORD		INTEGER	REFS	48	58	62
0 N		INTEGER	REFS	42	66	68
0 NUMB		INTEGER	REFS	39	40	42
166 N1		INTEGER	REFS	41	57	61
0 OFFD		REAL	REFS	44	DEFINED	67
0 PFFD		REAL	REFS	30	59	63
164 ROOT		REAL	REFS	42	56	65
			DEFINED	60	66	69
172 RUTE		REAL	REFS	65	DEFINED	73
0 SEC		REAL	REFS	30	40	42
0 SIGMA		REAL	REFS	30	60	66
167 TOL		REAL	REFS	46	47	65

SUBROUTINE STURM

74/74 OPT=1

## EXTERNALS PREP

INLINE FUNCTIONS	TYPE	ARGS	REFERENCES
ABS	REAL	1	INTRIN 65
ABSF	REAL	1 SF	34 65
AMAX1	REAL	0 INTRIN	45 47
AMAX1F	REAL	2 SF	35 45

## STATEMENT LABELS

		DEF LINE	REFERENCES
0	2	50	48
62	3	57	54
66	4	59	2*58
0	5	62	2*61
0	6	64	62
105	7	64	61
0	8	65	2*63
0	9	66	65
130	10	69	2*68
131	11	71	68
135	16	72	67
0	200	76	70
53	300	44	44
0	400	45	58
		2*44	
		55	2*65
		56	55

## LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES

42	2	1	48 50	3B
57	400	1	55 56	2B
77	6	1	62 64	6B
124	11	1	67 72	6B
				INSTACK
				EXITS
				INSTACK

## STATISTICS

PROGRAM LENGTH 1768 126  
52000B CM USED



SUBROUTINE PREP 74/74 OPT=1

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```
C      IF (LOW - N1) 100,100,130
60      200 RETURN
        END
```

```
PREP 59
PREP 60
PREP 61
PREP 62
```

## CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

37 1 AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES						
3	PREP	31	60						
VARIABLES	SN	TYPE	RELOCATE	JN					
0 D	REAL	ARRAY	F.P.	REFS	33	48	DEFINED	31	56
62 I	INTEGER		F.P.	REFS	48	51	DEFINED	57	56
0 KPREP	INTEGER		F.P.	REFS	37	DEFINED	31	54	54
61 LAWD	INTEGER		F.P.	REFS	50	52	DEFINED	44	50
0 LORD	INTEGER		F.P.	DEFINED	31	52	DEFINED	44	50
60 LOW	INTEGER		F.P.	REFS	47	58	DEFINED	43	57
0 N	INTEGER		F.P.	REFS	39	DEFINED	31	58	58
56 N1	INTEGER		F.P.	REFS	47	58	DEFINED	39	39
57 RDO	REAL		F.P.	REFS	48	DEFINED	42	42	42
63 RD2	REAL		F.P.	REFS	35	48	DEFINED	45	45
64 RD4	REAL		F.P.	REFS	35	49	DEFINED	46	46
63 RE2	REAL		F.P.	REFS	35	55	DEFINED	51	51
64 RE4	REAL		F.P.	REFS	35	51	DEFINED	31	31
0 ROOT	REAL	ARRAY	F.P.	REFS	42	DEFINED	51	DEFINED	31
0 SEC	REAL		F.P.	REFS	33	51	DEFINED	31	31
STATEMENT LABELS			DEF LINE	REFERENCES					
15 50			38	37					
20 80			41	37					
23 100			45	2*58					
0 110		INACTIVE	50	49					
35 120			51	47					
42 130			52	58					
44 140			54	49					
0 150		INACTIVE	56	2*55					
50 160			57	55					
54 200			60	40					
53									
LOOPS LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES					
27 120	I	47 51	13B	OPT					
EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)		EXITS					
RD2	1	O RE2 (1)							
RD4	1	O RE4 (1)							

SUBROUTINE PREP            74/74            OPT=1  
STATISTICS  
PROGRAM LENGTH            708            56  
52000B CM USED

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PAGE 3

OPT = 1

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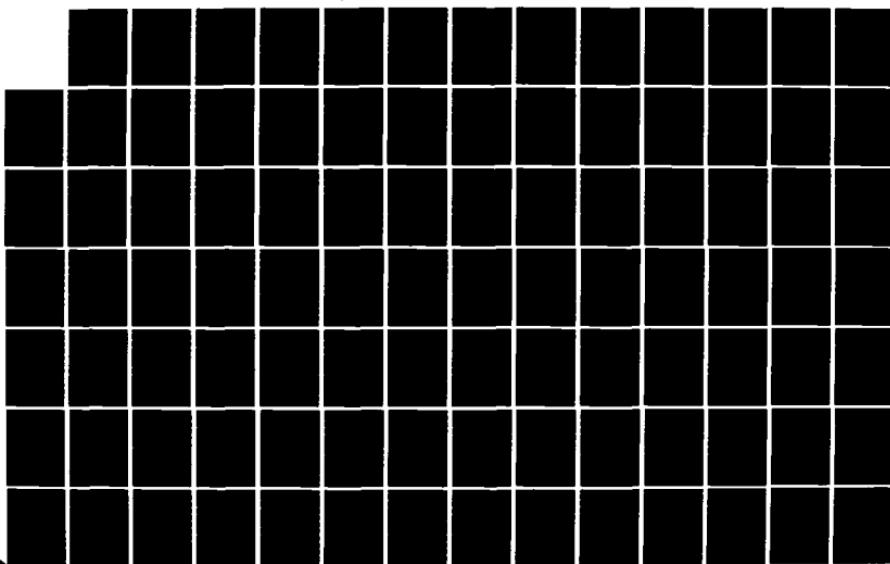
AD-A152 270

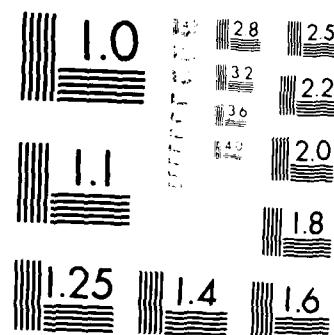
ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER  
PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1  
UNCLASSIFIED N00019-81-C-0395

5/8

F/G 9/2

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

SUBROUTINE QSVEC

FTN 4.8+577

PAGE 2

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C PART 1. PRELIMINARIES.

C 50 CONTINUE

IX = 1

IA = 1

N1 = N - 1

N2 = N - 2

GO TO 370

C 80 CONTINUE

ASSIGN 170 TO KOUNT  
TOL = 0.

DO 100 I = 1,N

P(I) = D(I) - ROOT

Q(I) = OFFD(I)

R(I) = 0.

TOL = AMAX1F(TOL, ABSF(D(I)))

100 X(I) = RDW(X) + 1

TOL = (TOL + 1.E-15) \* 1.E-15

C PART 2. MATRIX DECOMPOSITION.

C 80 DO 150 I = 1,N!

T = ABSF(P(I))

U = ABSF(OFFD(I))

IF (T + U - TOL) 110, 120, 120

110 P(I) = TOL

T = P(I)

120 IF (T - U) 130, 140, 140

130 S(I) = P(I)\*OFFD(I)

S(I) = ANDR(S(I),1,1)

TEMP = Q(I)

P(I) = OFFD(I)

Q(I) = P(I+1)

R(I) = Q(I+1)

P(I+1) = TEMP - S(I)\*Q(I)

Q(I+1) = -S(I)\*R(I)

GO TO 150

C 140 S(I) = OFFD(I)/P(I)

S(I) = ANDR(S(I),MINUS2,0)

P(I+1) = P(I+1) - S(I)\*Q(I)

150 CONTINUE

IF (ABSF(P(N)) .LT. TOL) P(N) = TOL

GO TO 210

C PART 3. RIGHT SIDE MODIFICATION.

C 170 ASSIGN 330 TO KOUNT

DO 200 I = 1,N!

TEMP = ANDR(S(I),1,0)

IF (TEMP) 180, 190, 180

180 T = X(I)

X(I) = X(I+1)

X(I+1) = T - S(I)\*X(I)

GO TO 200

190 X(I+1) = X(I+1) - S(I)\*X(I)

200 CONTINUE

QSVEC 59

QSVEC 60

QSVEC 61

QSVEC 62

QSVEC 63

QSVEC 64

QSVEC 65

QSVEC 66

QSVEC 67

QSVEC 68

QSVEC 69

QSVEC 70

QSVEC 71

QSVEC 72

QSVEC 73

QSVEC 74

QSVEC 75

QSVEC 76

QSVEC 77

QSVEC 78

QSVEC 79

QSVEC 80

QSVEC 81

QSVEC 82

QSVEC 83

QSVEC 84

QSVEC 85

QSVEC 86

QSVEC 87

QSVEC 88

QSVEC 89

QSVEC 90

QSVEC 91

QSVEC 92

QSVEC 93

QSVEC 94

QSVEC 95

QSVEC 96

QSVEC 97

QSVEC 98

QSVEC 99

QSVEC 100

QSVEC 101

QSVEC 102

QSVEC 103

QSVEC 104

QSVEC 105

QSVEC 106

QSVEC 107

QSVEC 108

QSVEC 109

QSVEC 110

QSVEC 111

QSVEC 112

QSVEC 113

QSVEC 114

QSVEC 115

SUBROUTINE QSVEC    74/74    OPT=1

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```

115      C      PART 4. TRIANGULAR SYSTEM SOLUTION.
116      C      210 X(N) = X(N)/P(N)
117          X(N1) = (X(N1) - Q(N1)*X(N)) / P(N1)
118          DO 220 I = 2,N1
119              K = N - I
120              220 X(K) = (X(K) - Q(K)*X(K+1) - R(K)*X(K+2)) / P(K)
121
122      C      PART 5. SCALING TO UNIT VECTOR.
123      C      230 SUM = O.EO
124          M = N
125          SCALAR = SQRTF(DOTPRO(X,X))
126          DO 250 I = 1,N
127              250 X(I) = X(I)/SCALAR
128          GO TO KOUNT, (170,330,370)
129
130      C      PART 6. TRANSFORMATION BY ORTHOGONAL MATRICES.
131      C      330 L = (N*(N+1))/2 - 4
132          DO 360 I = 1,N2
133              NI = N - I
134              SUM = O.EO
135              M = I + 1
136              SCALAR = A(L-1) * DOTPRO(X(NI),A(L))
137              IJ = L
138              DO 350 J = NI,N
139                  X(J) = X(J) + SCALAR*A(IJ)
140                  350 IJ = IJ + 1
141              360 L = L - 1 - 3
142              ASSIGN 370 TO KOUNT
143              GO TO 230
144
145      C      370 RETURN
146

```

SYNTHETIC CROWN POLYMERS

## **DIAGNOSIS OF PROBLEM**

### S Y M B O L I C   R E F E R E N C E   M A P   (R=3)



SUBROUTINE QSVEC

74/74 OPT=1

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STATEMENT LABELS

15	50	
22	80	
0	100	
0	110	INACTIVE
56	120	
0	130	INACTIVE
76	140	
106	150	
117	170	
0	180	INACTIVE
132	190	
136	200	
141	210	
0	220	
171	230	
0	250	
212	330	
0	350	
0	360	
251	370	

25	100	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS
47	150	1	70 75	17B		
121	200	1	80 99	42B		
161	220	1	106 114	20B		
205	250	1	120 122	7B	INSTACK	
216	360	1	129 130	3B	INSTACK	
236	350	J	136 145	31B	INSTACK	EXT REFS
			142 144	3B	INSTACK	NOT INNER
COMMON	BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)			
CVIBRA	INFO	4	O SUM (1)	1 M (1)	2 IX (1)	
			3 IA (1)	1 TOL 1 (1)	2 TOL2 (1)	
			O TOLO (1)			
			3 MINUS2 (1)			

STATISTICS

PROGRAM LENGTH  
CM LABELED COMMON LENGTH  
52000B CM USED

370B 248  
10B 8

1	M	(1)	2 IX (1)
3	IA	(1)	
1	TOL 1	(1)	2 TOL2 (1)
3	MINUS2	(1)	



SUBROUTINE SWAP 74/74 OPT=1

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```

IMAGE = IMAGE - K
INTO = IMAGE
I = K
130 IF (KEY) 150,190,150
140 KEY = O
150 KEY = O
160 LOV2 = L / 2
160 K = L - 2
DO 170 I = 3,LOV2
X = A(I)
A(I) = A(K)
A(K) = X
170 K = K - 1
IF (KEY) 180,190,180
180 KEY = O
GO TO 100
C 190 RETURN
END

```

75

```

SWAP 59
SWAP 60
SWAP 61
SWAP 62
SWAP 63
SWAP 64
SWAP 65
SWAP 66
SWAP 67
SWAP 68
SWAP 69
SWAP 70
SWAP 71
SWAP 72
SWAP 73
SWAP 74
SWAP 75
SWAP 76

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES						
VARIABLES	SN	TYPE	RELOCATION	F.P.	REFS	DEFINED		
0 A		REAL	ARRAY		31	51	52	66
103 I		INTEGER			29	52	53	67
105 IK		INTEGER			54	55	66	68
101 IMAGE		INTEGER			60	65		
102 INTO		INTEGER			REFS	51	52	DEFINED
104 K		INTEGER			REFS	58	59	50
75 KEY		INTEGER			REFS	52	53	46
77 KKT		INTEGER			REFS	52	53	54
74 L		INTEGER			REFS	56	57	58
76 LOCK		INTEGER			REFS	57	58	47
107 LOV2		INTEGER			DEFINED	49	64	54
0 M		INTEGER			REFS	61	70	58
73 N		INTEGER			REFS	50	56	67
100 NKF		REAL			REFS	44	45	68
106 X					DEFINED	37	41	64
INLINE FUNCTIONS					DEFINED	44	46	DEFINED
IABS		INTEGER			REFS	46	47	39
IABSF		INTEGER			REFS	49	50	41
STATEMENT LABELS					DEFINED	65	66	42
0 90		INACTIVE			DEFINED	37	42	63
17 100		INACTIVE			REFS	38	43	72
0 110		INACTIVE			REFS	35	44	74

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SUBROUTINE SWAP      74/74      OPT=1

STATEMENT LABELS

	DEF LINE	REFERENCES
0 120	55	50
0 130	60	49
51 140	61	43
0 150	62	2*61
53 160	63	42
0 170	69	65
0 180	71	2*70
72 190	74	2*38
		42
		61
		70

LOOPS      LABEL      INDEX

	FROM-TO	LENGTH	PROPERTIES
27 130	K 49 60	22B	NOT INNER
33 120	IK 50 55	5B	INSTACK
63 170	I 65 69	3B	INSTACK

STATISTICS

PROGRAM LENGTH 112B  
52000B CM USED 74

74/74 OPT=1

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```
1      C45700, FUN. DOTPRO          DOTPRO 2
C      *****                         DOTPRO 3
C      *****                         DOTPRO 4
C      *****                         DOTPRO 5
C      *****                         DOTPRO 6
C      *****                         DOTPRO 7
C      *****                         DOTPRO 8
C      *****                         DOTPRO 9
C      *****                         DOTPRO 10
C      *****                         DOTPRO 11
C      *****                         DOTPRO 12
C      *****                         DOTPRO 13
C      *****                         DOTPRO 14
C      *****                         DOTPRO 15
C      *****                         DOTPRO 16
C      *****                         DOTPRO 17
C      *****                         DOTPRO 18
C      *****                         DOTPRO 19
C      *****                         DOTPRO 20
C      *****                         DOTPRO 21
C      *****                         DOTPRO 22
C      *****                         DOTPRO 23
C      *****                         DOTPRO 24
C      *****                         DOTPRO 25
C      *****                         DOTPRO 26
C      *****                         DOTPRO 27
C      *****                         DOTPRO 28
C      *****                         DOTPRO 29
C      *****                         DOTPRO 30
C      *****                         DOTPRO 31
C      *****                         DOTPRO 32
C      *****                         DOTPRO 33
C      *****                         DOTPRO 34
C      *****                         DOTPRO 35
C      *****                         DOTPRO 36
C      *****                         DOTPRO 37
C      *****                         DOTPRO 38
C      *****                         DOTPRO 39
C      *****                         DOTPRO 40
C      *****                         DOTPRO 41
C      *****                         DOTPRO 42
C      *****                         DOTPRO 43
C      *****                         DOTPRO 44
C      *****                         DOTPRO 45
C      *****                         DOTPRO 46
C      *****                         DOTPRO 47
C      *****                         DOTPRO 48
C      *****                         DOTPRO 49
C      *****                         DOTPRO 50
C      *****                         DOTPRO 51
C      *****                         DOTPRO 52

      C*** COMPUTER VERSION *****
      C*** SUBROUTINE *****
      C*** IBM ... INCLUDES DOUBLE PRECISION TYPE STATEMENTS. COLUMN ONE ***
      C*** SHOULD BE BLANK.                                              ***
      C*** CDC .... DOES NOT INCLUDE DOUBLE PRECISION TYPE STATEMENTS. ***
      C*** THESE STATEMENTS ARE CONVERTED INTO COMMENTS BY ***
      C*** INSERTING THE LETTER C IN COLUMN ONE. ***
      C*** OBJECTIVE *****
      C*** CALCULATE THE DOT PRODUCT OF TWO VECTORS ***
      C*** INPUT/OUTPUT ***
      C*** SUMMARY OF SYMBOLS ***
      C*** ERROR MESSAGES ***
      C*** NONE. ***
      C*** FUNCTION DOTPRO(X,Y)
      C*** BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C*** DOUBLE PRECISION S, DOTPRO
      C*** ENDING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
      C*** DIMENSION X(1),Y(1)
      C*** COMMON /INFO/ S,N,IX,IY
      C      IF (N) 120,100
      100   JX = 1
      JY = 1
      DO 110  J = 1,N
      S = S + X(JX)*Y(JY)
      JX = JX + IX
      110   JY = JY + IY
      120   DOTPRO = S
      C      RETURN
      END
```

FUNCTION DOTPRO 74/74 OPT=1

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## SYMBOLIC REFERENCE MAP (R=3)

SYMBOLIC REFERENCE MAP (R=3)			
ENTRY	POINTS	DEF LINE	REFERENCES
4	DOTPRO	31	50
VARIABLES	SN	TYPE	RELOCATION
30	DOTPRO	REAL	INFO
2	IX	INTEGER	REFS
3	IY	INTEGER	INFO
33	J	*	REFS
31	JX	INTEGER	DEFINED
32	JY	INTEGER	REFS
1	N	INTEGER	REFS
0	S	REAL	INFO
0	X	REAL	ARRAY
0	Y	REAL	ARRAY
STATEMENT LABELS		DEF LINE	REFERENCES
0	100	INACTIVE	42
0	110		47
26	120		48
LOOPS	LABEL	INDEX	FROM-TO LENGTH PROPERTIES
20	110	J	44 47 4B INSTACK
COMMON BLOCKS	LENGTH		MEMBERS - BIAS NAME(LENGTH)
INFO	4		O S (1) 3 IY (1)
STATISTICS			1 N (1)
PROGRAM LENGTH			2 IX (1)
CM LABELED COMMON LENGTH		368	30
52000B CM USED		4B	4

74 / 74 OPT = 1

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## **SYMBOLIC REFERENCE MAP (B=3)**

ENTRY POINTS	VARIABLES	DEF LINE	REFERENCES
4 ANDOR	17 ANDOR	27	39
	20 E	REAL	DEFINED
	0 IFLAG	INTEGER	REFS
	21 JA	LOGICAL	REFS
	22 NEIN	LOGICAL	REFS
	23 P	CHAR	REFS

FUNCTION ANDR            74/74            OPT=1            FTN 4 . 8+577            85/01/23            08.10.44            PAGE            2

VARIABLES	SN	TYPE	RELOCATION	REFS	DEFINITION	33
21	SI	REAL		REFS	31	DEFINED
20	UND	LOGICAL		REFS	29	DEFINED
O	X	REAL	F P	REFS	33	DEFINED
O	Y	REAL	F.P.	REFS	34	DEFINED

STATEMENT LABELS            DEF LINE            REFERENCES  
O 1            INACTIVE            33

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
UND	1	O E (1)
JA	1	O SI (1)
NEIN	1	O RNO (1)

STATISTICS  
PROGRAM LENGTH            23B            19  
52000B CM USED

```

1      C45700, SUB TRIEQ
C
C*** SUBROUTINE
C
C*** COMPUTER VERSION *****
C
C IBM    INCLUDES DOUBLE PRECISION TYPE STATEMENTS. COLUMN ONE
C       SHOULD BE BLANK.
C
C CDC     DOES NOT INCLUDE DOUBLE PRECISION TYPE STATEMENTS.
C       THESE STATEMENTS ARE CONVERTED INTO COMMENTS BY
C       INSERTING THE LETTER C IN COLUMN ONE.
C
C*** OBJECTIVE *****
C
C CALCULATE THE EIGENVECTORS IN THE PHYSICAL COORDINATE SYSTEM
C USING THE TRANSPOSE OF THE CHOLESKY DECOMPOSITION MATRIX
C AND THE EIGENVECTORS IN THE TRANSFORMED COORDINATE SYSTEM.
C
C*** INPUT/OUTPUT *****
C
C*** SUMMARY OF SYMBOLS *****
C
C*** ERROR MESSAGES *****
C
C*** NONE.
C
C*** SUBROUTINE TRIEQ (A,Y,M,L,INDIC8)
C
C1BM BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C DOUBLE PRECISION SUM
C1BM ENDING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
C DIMENSION A(1),Y(1)
C
C EQUIVALENCE (SUN,SUM)
C
C L1 = L
C LM1 = L1-1
C MM1 = M-1
C
C100 IF (INDIC8) 130, 100, 100
C      Y(L1) = Y(L1)/A(L1)
C      IF (MM1) 105, 125, 105
C105 I1 = L1
C      DO 120 I=L1,MM1
C          I1 = I1+I
C          SUM = -Y(I+1)
C          IJ = I1
C          DQ 110 J=L1,1
C          SUM = SUM+A(I,J)*Y(J)
C
C120 CONTINUE
C
C130 END
C
C140 END
C
C150 END
C
C160 END
C
C170 END
C
C180 END
C
C190 END
C
C200 END
C
C210 END
C
C220 END
C
C230 END
C
C240 END
C
C250 END
C
C260 END
C
C270 END
C
C280 END
C
C290 END
C
C300 END
C
C310 END
C
C320 END
C
C330 END
C
C340 END
C
C350 END
C
C360 END
C
C370 END
C
C380 END
C
C390 END
C
C400 END
C
C410 END
C
C420 END
C
C430 END
C
C440 END
C
C450 END
C
C460 END
C
C470 END
C
C480 END
C
C490 END
C
C500 END
C
C510 END
C
C520 END
C
C530 END
C
C540 END
C
C550 END
C
C560 END
C
C570 END
C
C580 END
C

```

```

      WRITE(1TAPEW,9004)
      KOUNT=KOUNT+4          VIBRAP 287
      25 CONTINUE             VIBRAP 288
      WRITE(1TAPEW,9006) NUM, (XPRIM(J,NUM), J= 1,3), DOF(NUM) VIBRAP 289
      KOUNT=KOUNT+1           VIBRAP 290
      20 CONTINUE             VIBRAP 291
      C
      C   READ THE REFERENCE BEAM & THE RATIO OF MAXIMUM DISPLACEMENT VIBRAP 292
      C   TO THE REFERENCE BEAM LENGTH VIBRAP 293
      C   READ(1TAPER,9007) BMREF,RATIO VIBRAP 294
      C
      C   READ BEAM NAME, NUMBER OF PTS ON BEAM, AND BEAM POINT NUMBERS VIBRAP 295
      C   READ(1TAPER,9003) NBEAMS VIBRAP 296
      C   KOUNT=LINES VIBRAP 297
      C
      C   DO 30 I=1,NBEAMS VIBRAP 298
      C   READ(1TAPER,9008) WORD1,WORD2,NPTBM VIBRAP 299
      C   READ(1TAPER,9003) (JPTS(K),K=1,NPTBM) VIBRAP 300
      CALL TITLES(2)          VIBRAP 301
      IF (KOUNT GT KOUNTH) GO TO 29 VIBRAP 302
      WRITE(1TAPEW,9009)      VIBRAP 303
      KOUNT=KOUNT+5           VIBRAP 304
      29 CONTINUE             VIBRAP 305
      WRITE(1TAPEW,9010) I,WORD1,WORD2,(JPTS(K),K=1,NPTBM) VIBRAP 306
      KOUNT=KOUNT+1           VIBRAP 307
      C   WRITE THE INPUT DATA ON MTAP3 FOR USE LATER ON IN THE PROGRAM VIBRAP 308
      C   WRITE(MTAP3) WORD1,WORD2, NPTBM VIBRAP 309
      WRITE(MTAP3) (JPTS(K),K=1,NPTBM) VIBRAP 310
      IF (WORD1.EQ.BMREF(1).AND.WORD2.EQ.BMREF(2)) GO TO 17 VIBRAP 311
      GO TO 30                VIBRAP 312
      C   COMPUTE THE REFERENCE BEAM LENGTH TO RESCALE MODAL DISPLACEMENTS VIBRAP 313
      320 C   17 NENDP1 = JPTS(1) VIBRAP 314
      NENDP2 = JPTS(NPTBM) VIBRAP 315
      XDIST = XPRIM(1,NENDP1) - XPRIM(1,NENDP2) VIBRAP 316
      YDIST = XPRIM(2,NENDP1) - XPRIM(2,NENDP2) VIBRAP 317
      ZDIST = XPRIM(3,NENDP1) - XPRIM(3,NENDP2) VIBRAP 318
      BEAML2 = XDIST**2 + YDIST**2 + ZDIST**2 VIBRAP 319
      BEAML = SORT(BEAML2) VIBRAP 320
      DSPMX1 = RATIO * BEAML VIBRAP 321
      30 CONTINUE             VIBRAP 322
      C
      C   IUCOM=IUPHTF VIBRAP 323
      IFCOM=IFPHTF VIBRAP 324
      IF (KFREE.EQ.2) IUCOM=IUPATF VIBRAP 325
      IF (KFREE.EQ.2) IFCOM=IPATF VIBRAP 326
      330 C   CALL GEDLAB(8HVIBRAPO1,IUCOM,NAME,IFCOM,NMODES,NCOL) VIBRAP 327
      C
      C   IUCOM=IUPHTF VIBRAP 328
      IFCOM=IFPHTF VIBRAP 329
      IF (KFREE.EQ.2) IUCOM=IUPATF VIBRAP 330
      IF (KFREE.EQ.2) IFCOM=IPATF VIBRAP 331
      335 C
      C   VIBRAP 332
      VIBRAP 333
      VIBRAP 334
      VIBRAP 335
      VIBRAP 336
      VIBRAP 337
      VIBRAP 338
      VIBRAP 339
      VIBRAP 340
      VIBRAP 341
      VIBRAP 342
      VIBRAP 343

```

ROUTINE VIBRAP 74/74 OPT=1

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```

230      C FORM ELEMENTS OF A MATRIX - USED TO DEFINE FIRST ROTATION
        C
        C   A(1,1) = 1.
        C   A(2,2) = COS(THET1R)
        C   A(2,3) = SIN(THET1R)
        C   A(3,2) = -SIN(THET1R)
        C   A(3,3) = COS(THET1R)

235      C FORM ELEMENTS OF B MATRIX - USED TO DEFINE SECOND ROTATION
        C
        C   B(1,1) = COS(THET2R)
        C   B(1,3) = -SIN(THET2R)
        C   B(2,2) = 1.
        C   B(3,1) = SIN(THET2R)
        C   B(3,3) = COS(THET2R)

245      C FORM ELEMENTS OF C MATRIX - USED TO DEFINE THIRD ROTATION
        C
        C   C(1,1) = COS(THET3R)
        C   C(1,2) = SIN(THET3R)
        C   C(2,1) = -SIN(THET3R)
        C   C(2,2) = COS(THET3R)
        C   C(3,3) = 1.

250      C POSTMULTIPLY C MATRIX BY B
        C   CALL MMULT (C,B,XXX,3,3,3,3,3)
        C
        C POSTMULTIPLY CB BY A
        C   CALL MMULT (XXX,A,PI,3,3,3,3,3)
        C
        C TRANSPOSE PI MATRIX
        C
        C   DO 10 I=1,3
        C   DO 10 J=1,3
        C   10 PIR(I,J) = PI(J,I)

260      C PREMULTIPLY PI TRANSPOSE BY RORMV TO GET PROJECTING MATRIX
        C   Y-Z PLANE.
        C   CALL MMULT (RORMV,PITR,PROD,2,3,3,2,3,2)

265      C PROD IS MATRIX USED TO TRANSFORM TO VIEWING PLANE (Y-Z)
        C   WRITE (ITAPEW,500) ((PROD(I,J),J=1,3),I=1,2)
        C   500 FORMAT (3E15.6)

270      C
        C   READ(ITAPER,9003) NC
        C   NC IS THE NUMBER OF CARDS ON WHICH COORDINATES ARE ENTERED
        C
        C   CALL PLB(1,3,ITAPEW)
        C   KOUNT=KOUNT+3
        C   WRITE (ITAPEW,9004)
        C   KOUNT=KOUNT+4

275      C   DO 20 I=1,NC
        C   READ(ITAPER,9005) NUM,(XPRIM(J,NUM),J=1,3),DOF (NUM)
        C   CALL TITLES(2)
        C   20 CONTINUE

```

SUBROUTINE VIBRAP      74 / 74      OPT = 1

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C THE VIEW THAT THIS PROGRAM WILL PRINT ON THE CALCOMP PLOTTER  
C IS SPECIFIED BY 3 ANGLES OF ROTATION, THET1D, THET2D,  
C AND THET3D. IMAGINE A LEFT HAND COORDINATE SYSTEM ATTACHED TO  
C THE SURFACE TO BE DRAWN WITH THE ORIGIN AT THE FORWARD MOST  
C POINT OF THE SURFACE. THE  
C POSITIVE X AXIS IS AFT  
C POSITIVE Y AXIS IS OUTBOARD ON THE LEFT WING  
C POSITIVE Z AXIS IS UP  
C THE SURFACE TO BE DRAWN IS FIRST ROTATED ALONG THE X -AXIS  
C THROUGH AN ANGLE, THET1D (DEGREES). NEXT, FOLLOWS A ROTATION  
C ABOUT THE CARRIED Y -AXIS OF THET2D (DEGREES) AND FINALLY  
C A ROTATION OF THET3D (DEGREES) ABOUT THE CARRIED Z -AXIS. NOTE  
C THAT ALL ROTATIONS ARE POSITIVE ACCORDING TO THE LEFT HAND RULE.  
C THE VIEW ON THE CALCOMP WILL BE ALONG THE ORIGINAL (I.E., UNRO-  
C TATED) Z -AXIS. THE X AND Y AXES FROM AFT TO FORE (I.E., ALONG VECTORS ALONG NEGATIVE X AND  
C 200  
C 205  
C 210  
C 215

```

2220      C READ THE ANGLES ASSOCIATED WITH THE PERSPECTIVE VIEWING
2220      C
2220      C READ(ITAPER,9002) THET1D,THET2D,THET3D
2220      C
2225      C 23 DEGTOR = 3.14159/180.
2225      C     THET1R = THET1D * DEGTOR
2225      C     THET2R = THET2D * DEGTOR
2225      C     THET3R = THET3D * DEGTOR

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1, IUGO2, IUGO3, IUGD4,	VIBRAP	60	
4, IUCD, IUPR,	VIBRAP	61	
IUSTFN, IFSTFN,	VIBRAP	62	
O,	VIBRAP	63	
BALI, IFBALI,	VIBRAP	64	
D,	VIBRAP	65	
VIBRAP	VIBRAP	66	
VIBRAP	VIBRAP	67	
VIBRAP	VIBRAP	68	
VIBRAP	VIBRAP	69	
VIBRAP	VIBRAP	70	
D, IFADD, IUBAL, IFBAL,	VIBRAP	71	
DUM3, IFDUM3,	VIBRAP	72	
, IFZR, IULR, IFLR,	VIBRAP	73	
, IFQI, IUQ, IFQ,	VIBRAP	74	
, IFINCK	VIBRAP	75	
USLT1, IFSLT1	VIBRAP	76	
UPDATE, IFPATF	VIBRAP	77	
, IFDLT	VIBRAP	78	
FPHA, IUPHAT, IFPHAT	VIBRAP	79	
D(2, 153))	VIBRAP	80	
))	VIBRAP	81	
.B(1, 1))	VIBRAP	82	
VIBRAP	VIBRAP	83	
VIBRAP	VIBRAP	84	
VIBRAP	VIBRAP	85	
)	VIBRAP	86	
VIBRAP	VIBRAP	87	
VIBRAP	VIBRAP	88	
VIBRAP	VIBRAP	89	
VIBRAP	VIBRAP	90	
VIBRAP	VIBRAP	91	
VIBRAP	VIBRAP	92	
VIBRAP	VIBRAP	93	
VIBRAP	VIBRAP	94	
VIBRAP	VIBRAP	95	
VIBRAP	VIBRAP	96	
VIBRAP	VIBRAP	97	
VIBRAP	VIBRAP	98	
VIBRAP	VIBRAP	99	
VIBRAP	VIBRAP	100	
VIBRAP	VIBRAP	101	
VIBRAP	VIBRAP	102	
VIBRAP	VIBRAP	103	
VIBRAP	VIBRAP	104	
VIBRAP	VIBRAP	105	
VIBRAP	VIBRAP	106	
VIBRAP	VIBRAP	107	
VIBRAP	VIBRAP	108	
VIBRAP	VIBRAP	109	
VIBRAP	VIBRAP	110	
VIBRAP	VIBRAP	111	
VIBRAP	VIBRAP	112	
VIBRAP	VIBRAP	113	
VIBRAP	VIBRAP	114	
COMPUTER PROGRAMS			
UTER PROGRAMS			

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SUBROUTINE VIBRAP      74/74    OPT=1          FTN 4.8+577      85/01/23. 08. 10. 44      PAGE   1
1      C      SUBROUTINE VIBRAP (KPLOTV,KPLOTF,NPLOTV)          VIBRAP   2
C      C      INTEGER YES          VIBRAP   3
C      C      THIS PROGRAM WILL DRAW A GRID AND MODE SHAPE IN PROJECTION ON THE VIBRAP   4
C      C      CALCOMP PLOTTER          VIBRAP   5
C      C
C      C      MAXIMUM NUMBER OF BEAMS IN GRID = 40          VIBRAP   6
C      C
C      C      MAXIMUM NUMBER OF POINTS ON A BEAM = 20          VIBRAP   7
C      C
C      C      LARGEST VALUE OF GRID PT. NUMBER = 800          VIBRAP   8
C      C
C      C      MAXIMUM NUMBER OF MODES TO BE PLOTTED = 20          VIBRAP   9
C      C
C      C      CIBM   DIMENSION BUFFER(1512)          VIBRAP 10
C      C      CIBM   DIMENSION BUFFER(1512)          VIBRAP 11
C      C
C      C      CCDC   DIMENSION BUFFER(512)          VIBRAP 12
C      C
C      C      DIMENSION A(3,3)          B(3,3) ,          C(3,3)          VIBRAP 13
C      C      DIMENSION BMREF(2)          DOF(800)          VIBRAP 14
C      C      DIMENSION DISP(800)          VIBRAP 15
C      C      DIMENSION DISPT(3,20)          VIBRAP 16
C      C      DIMENSION IDISP(800)          VIBRAP 17
C      C      DIMENSION ITAPES(50)          VIBRAP 18
C      C      DIMENSION JPTS(20)          VIBRAP 19
C      C
C      C      DIMENSION MPLOT(40)          NCDEF(457) .          NPTSBM(40)          VIBRAP 20
C      C      DIMENSION NCORD(457)          PROD(2,3) .          VIBRAP 21
C      C      DIMENSION RORMV(2,3)          SCR72(2)          VIBRAP 22
C      C      DIMENSION SCRTCH(3)          VIBRAP 23
C      C      DIMENSION TITLE(18)          VIBRAP 24
C      C      DIMENSION U(457)          V(457)          VIBRAP 25
C      C      DIMENSION UU(457)          VV(457)          VIBRAP 26
C      C      DIMENSION U1(4)          V1(4)          VIBRAP 27
C      C      DIMENSION WKAREA(3,20)          COORD(3,457)          VIBRAP 28
C      C      DIMENSION WORK(200)          VIBRAP 29
C      C
C      C      DIMENSION XXX(3,3)          PI(3,3) ,          PITR(3,3)          VIBRAP 30
C      C      DIMENSION XPRIM(3,800)          VIBRAP 31
C      C      DIMENSION XX(954 )          VIBRAP 32
C      C      DIMENSION XX2(954 )          VIBRAP 33
C      C      DIMENSION YMIN(40)          ZMIN(40)          VIBRAP 34
C      C      DIMENSION YMAX(40)          ZMAX(40)          VIBRAP 35
C      C      DIMENSION NAME(2)          VIBRAP 36
C
C      C      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP          VIBRAP 37
C      C      COMMON /CTAPES/ ITAPES          VIBRAP 38
C      C      COMMON /CPLTS/ KPLOTS          VIBRAP 39
C      C      COMMON /CONSTS/ NO , YES          VIBRAP 40
C
C      C      COMMON /INSTR/ INSTRNAME          VIBRAP 41
C      C      COMMON /OUTSTR/ OUTSTRNAME          VIBRAP 42
C      C      COMMON /PLOT/ PLOTNAME          VIBRAP 43
C      C      COMMON /PRINT/ PRINTNAME          VIBRAP 44
C      C      COMMON /TAPES/ TAPENAME          VIBRAP 45
C      C
C      C      C      VIBRAP 46
C      C      C      VIBRAP 47
C      C      C      VIBRAP 48
C      C      C      VIBRAP 49
C      C      C      VIBRAP 50
C      C      C      VIBRAP 51
C      C      C      VIBRAP 52
C      C      C      VIBRAP 53
C      C      C      VIBRAP 54
C      C      C      VIBRAP 55
C      C      C      VIBRAP 56
C      C      C      VIBRAP 57
C
C      C      C      VIBRAP 58

```

SUBROUTINE DAGGER

FTN 4.8+577

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STATEMENT LABELS

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PAGE 3

	46	120	52	46
0	130	54	40	
0	140	59	56	
0	150	62	2*61	
0	180	67	65	
0	190	69	62	
123	200	70	61	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	130	I	40 54	40B	NOT INNER
23	90	J	43 45	4B	INSTACK
40	110	J	49 51	5B	INSTACK
64	140	I	56 59	4B	INSTACK
77	190	L	62 69	24B	NOT INNER
110	180	J	65 67	4B	INSTACK

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
SUN	1	O SUM (1)

STATISTICS	PROGRAM LENGTH	150B	104
	52000B CM USED		



74 / 74 OPT = 1

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1

SUBROUTINE FUTILE 74/74 OPT=1

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EXTERNALS SQRT TYPE REAL ARG 1 LIBRARY REFERENCES

INLINE FUNCTIONS SQRTF TYPE REAL ARG 1 SF DEF LINE REFERENCES  
17 60 57 46 70

STATEMENT LABELS INACTIVE DEF LINE REFERENCES  
0 50 55 54  
17 60 57 2\*54  
20 70 58 56  
26 80 62 57 61  
0 90 65 63  
41 100 66 55  
0 105 68 67  
0 110 70 69  
52 120 73 2\*67  
55 130 74 72  
0 140 75 59  
0 210 77 50  
66 220 80 83  
67 980 82 2\*69

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES EXT REFS EXITS NOT INNER  
11 210 K 50 77 54B  
23 140 I 59 75 36B  
34 90 KJ 63 65 4B INSTACK  
EQUIV CLASSES LENGTH MEMBERS - BIAS NAME(LENGTH)  
SUM 1 O SUM (1)

STATISTICS  
PROGRAM LENGTH 114B 76  
52000B CM USED

SUBROUTINE FUTILE		74/74 OPT=1	
		70	I1 = K1
		DO	I40 I=K, N
			SUM = -A(IK)
		GO TO	LEAP, (BO, 100)
60	IJ = I1	80	IJ = K1
		DO	KU=K1 KK1
			SUM=A(IU)*A(KU)
		90	IJ = IJ+1
65	I1 = I1+1	100	IF (I-K) 120, 105, 120
			DENOM = -SUM
		105	IF (DENOM) 980, 980, 110
			DENOM = -SQR(T(DENOM))
		110	A(IK) = -DENOM
			GO TO 130
		120	A(IK) = SUM/DENOM
			IK = IK+1
		130	CONTINUE
		140	K1 = K1+K
		150	CONTINUE
			NIX = 0
		C	220 RETURN
		C	980 NIX = -K
			GO TO 220
		C	END
70		80	
75		85	

SYMBOLIC REFERENCE MAP (R=3)					
ENTRY POINTS	DEF LINE	REFERENCES	RELOCATION	F.P.	
3	34	80	ARRAY		
VARIABLES	SN	TYPE			
O A		REAL			REFS
103 DENOM		REAL			REFS
100 I		INTEGER			REFS
101 IJ		INTEGER			REFS
74 IK		INTEGER			REFS
77 I1		INTEGER			REFS
73 K		INTEGER			REFS
					DEFINED
102 KJ		INTEGER			REFS
72 KK		INTEGER			REFS
75 KK1		INTEGER			REFS
71 K1		INTEGER			REFS
76 LEAP		INTEGER			REFS
O N		INTEGER			REFS
O NIX		REAL		F.P.	REFS
104 SUM		REAL		F.P.	REFS
104 SUN		REAL			REFS

```

1      C45700, SUB. FUTILE
C*****SUBROUTINE *****
C*** COMPUTER VERSION *****
C-----IBM . . . INCLUDES DOUBLE PRECISION TYPE STATEMENTS. COLUMN ONE
10     C SHOULD BE BLANK.
C      CDC . . . DOES NOT INCLUDE DOUBLE PRECISION TYPE STATEMENTS.
C      THESE STATEMENTS ARE CONVERTED INTO COMMENTS BY
C      INSERTING THE LETTER C IN COLUMN ONE.
15     C*** OBJECTIVE *****
C      FORM THE CHOLESKY DECOMPOSITION OF A MATRIX. GIVEN THE MATRIX
C      X, THE PROGRAM USES THE CHOLESKY DECOMPOSITION PROCEDURE TO SOLVE
C      FOR A MATRIX WHICH IS A LOWER TRIANGULAR MATRIX AS FOLLOWS.
20     C      X = (L) * (L TRANSPOSE).
C*** INPUT/OUTPUT *****
C
25     C*** SUMMARY OF SYMBOLS *****
C-----C*** ERROR MESSAGES *****
C-----C NONE.
30
C*****SUBROUTINE FUTILE (A,N,NX)
35     CIBM BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      DOUBLE PRECISION SUM
CIBM ENDING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
40     DIMENSION A(1)
C
45     C FUNCTION DEFINITION
C      SQRT(X) = SQRT(X)
C
50     C      K1 = 1
C      KK = 0
C      DO 210 K=1,N
C         KK = KK+K
C         IK = KK
C         KK1 = KK-1
C         IF ((KK1) 60,50,60
55     50 ASSIGN 100 TO LEAP
      GO TO 70
      GO ASSIGN 101 FAPP
      56
      57
      58
      FUTILE 2
      FUTILE 3
      FUTILE 4
      FUTILE 5
      FUTILE 6
      FUTILE 7
      FUTILE 8
      FUTILE 9
      FUTILE 10
      FUTILE 11
      FUTILE 12
      FUTILE 13
      FUTILE 14
      FUTILE 15
      FUTILE 16
      FUTILE 17
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      FUTILE 20
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      FUTILE 48
      FUTILE 49
      FUTILE 50
      FUTILE 51
      FUTILE 52
      FUTILE 53
      FUTILE 54
      FUTILE 55
      FUTILE 56
      FUTILE 57
      FUTILE 58
      FIITIF

```

SUBROUTINE TRIEQ 74/74 QFT=1

## STATEMENT LABELS

	DEF LINE	REFERENCES
45 125	61	50
47 130	62	48
52 140	63	61
54 145	64	73
O 150	68	2*67
O 160	72	70
101 170	75	2*61 67

## LOOPS LABEL INDEX

	FROM-TO	LENGTH	PROPERTIES
21 120	52 60	24B	NOT INNER
32 110	56 58	4B	INSTACK
74 160	70 72	3B	INSTACK

## EQUIV CLASSES LENGTH 1

MEMBERS - BIAS NAME(LENGTH)

SUN O SUM (1)

## STATISTICS

PROGRAM LENGTH  
52000B CM USED

121B

81

```

SUBROUTINE TRIEQ    74/74   OPT=1
      110 IJ = IJ+1
      111 = IJ
      120 Y(I+1) = -SUM/A(II)
      125 IF (INDIC8) 170,140,170
      130 I1 = (M*M+M)/2-LM1
      140 I = M
      145 Y(I) = Y(I)/A(II)
      151 I = I-1
      152 IF (I-L1) 170,150,150
      150 SUN = -Y(I+1)
      151 IJ = I1+L1
      DO 160 J=L1,I
      160 IJ = Y(J)+SUN*A(IJ)
      161 GO TO 145
      C   170 RETURN
      END

```

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PAGE 2

```

      TRIEQ 59
      TRIEQ 60
      TRIEQ 61
      TRIEQ 62
      TRIEQ 63
      TRIEQ 64
      TRIEQ 65
      TRIEQ 66
      TRIEQ 67
      TRIEQ 68
      TRIEQ 69
      TRIEQ 70
      TRIEQ 71
      TRIEQ 72
      TRIEQ 73
      TRIEQ 74
      TRIEQ 75
      TRIEQ 76
      TRIEQ 77

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	
3 TRIEQ	33	75	
VARIABLES	SN TYPE	ARRAY F.P.	
O A	REAL	REFS	40 49
106 I	INTEGER	DEFINED	33 54
111 I1	INTEGER	REFS	53 68
107 IJ	INTEGER	REFS	67 60
O INDIC8	INTEGER	DEFINED	55 57
105 I1	INTEGER	REFS	48 58
110 J	INTEGER	REFS	53 55
O L	INTEGER	REFS	57 2*71
103 LM1	INTEGER	DEFINED	45 33
102 L1	INTEGER	REFS	62 46
O M	INTEGER	DEFINED	46 3*49
104 MM1	INTEGER	REFS	47 45
112 SUM	REAL	REFS	50 52
112 SUN	REAL	REFS	43 57
O Y	REAL	ARRAY F.P.	43 71
		REFS	40 49
		DEFINED	33 49
STATEMENT LABELS		DEF LINE REFERENCES	
O 100	INACTIVE	49	2*48
O 105	INACTIVE	51	2*50
O 110		58	56
O 120		60	52

SUBROUTINE VIBRAP    74/74    OPT=1

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```
C   KOUNT=LINES
    CALL TITLES(2)
    WRITE(ITAPEW,9011) BMREF,BEAML,RATIO
    KOUNT=KOUNT+5
C   MPLOT IS AN ARRAY CONTAINING MODES TO BE PLOTTED
C
    READ(ITAPER,9003) NPLOTS
    READ(ITAPER,9003) (MPLOT(I),I=1,NPLOTS)
    CALL PLB(1,3,ITAPEW)
    KOUNT=KOUNT+3
    WRITE(ITAPEW,9012) NPLOTS,(MPLOT(I),I=1,NPLOTS)
C
    KOUNT=KOUNT+1
    READ DYNAMIC DOF'S IN THE ORDER IN WHICH THEY WILL BE PLOTTED
    C   IN THE DYNAMICS GRID
    READ(ITAPER,9003) NCDI
    READ(ITAPER,9003) (IDISP(I),I=1,NCDI)
C
    C   IF MPLOT(K) IS NEGATIVE, MODE PLOT WILL BE MULTIPLIED BY -1
    C
    MODE=0
    DO 21 KNTR=1,NPLOTS
    NEXT=MODE+1
    MODE=IBABS(MPLOT(KNTR))
    DO 48 I=NEXT,MODE
    48 CALL GETROW(TUCOM,1,WORK,NCOL)
    IF (KNTR.EQ.1) GOTO 22
    CALL PLOT (HSCLP4, 0., -3)
    22 CONTINUE
    XMODNO=MODE
    CALL NUMBER(-.5, 8., .28, XMODNO, 90., -1)
    JKNTK = 1
    39 CONTINUE
    L=IDISP(JKNTK)
    VALU=0.0
    IF(L.GE.1.AND.L.LE.NCOL) VALU=WORK(L)
    DISP(JKNTK)=VALU
    IF (JKNTK .EQ. NCDI) GO TO 44
    JKNTK = JKNTK + 1
    GOTO 39
    44 CONTINUE
    IF (MPLOT(KNTR).GT.0) GOTO 27
    DO 28 IM = 1,NCDI
    DISP(IM) = -DISP(IM)
    28 CONTINUE
    C   27 CONTINUE
    KOUNT=LINES
    NF=0
    90 CONTINUE
    NS=NF+1
    NF=NF+5
    IF (NF.GT.NCDI) NF=NCDI
    CALL TITLES(2)
    IF (KOUNT.GT.KOUNTH) GO TO 92
    WRITE(ITAPEW,9013) MODE
    KOUNT=KOUNT+5
```



SUBROUTINE VIBRAP 74/74 OPT=1

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```

C      WRITE(6,500) ((WKAREA(K1,K2),K1=1,3),K2=1,NPTBM)
C      WRITE (ITAPEW,500) (DISPPT(1,II),DISPPT(2,II),DISPPT(3,II),
C      1      IF (NPTBM.EQ.2) GO TO 11

```

460

```

C      JUMP = 6

```

```

C      24/JUMP DEFINES THE NUMBER OF SPACES BETWEEN ADJACENT PTS USED
C      TO DRAW THE CURVE THRU THE UNDEFORMED BEAM

```

465

```

C      NCOORD(1) = (NPTBM - 1) * 24 / JUMP + 1

```

```

C      NCOORD IS THE NUMBER OF POINTS NEEDED TO DEFINE THE CURVE
C      THROUGH THE UNDEFORMED BEAM
C      COORD IS THE (3,COORD) ARRAY CONTAINING THE COORDINATES
C      OF THE CURVE THROUGH THE UNDEFORMED BEAM

```

C

```

N1 = NCOORD(1)
CALL FERGCV (JUMP,WKAREA,NPTBM,COORD,N1)
WRITE (ITAPEW,500) ((COORD(II,J),II=1,3),J=1,N1)
DO 32 II=1,N1
      C      TRANSFORM TO THE Y-Z PLANE
      CALL CLCORD (PROD, COORD(1,II), SCRT2)
      XX(II) = SCRT2(1)
      XX2(II) = SCRT2(2)
      C      WRITE (ITAPEW,500) SCRT2(1),SCRT2(2)
      32 CONTINUE

```

C

```

GO TO 12

```

11 DO 13 II=1,2

```

CALL CLCORD (PROD, WKAREA(1,II), SCRT2)
XX(II) = SCRT2(1)
XX2(II) = SCRT2(2)
C      WRITE (ITAPEW,500) SCRT2(1), SCRT2(2)

```

490

13 CONTINUE

NCOORD(1) = 2

N1 = NCOORD(1)

C

12 CONTINUE

C

```

C      DEFINE COORDINATES OF DISPLACEMENT LINE FOR EACH POINT ON THE BEAM
C      INDX = NPTBM + 1
C      DO 41 II=1,NPTBM
C      IND1 = INDX - II
C      NUM = JPTS(IND1)
CALL CLCORD (PROD, XPRIM(1,NUM), SCRT2)
XX(N1 + 2*II - 1) = SCRT2(1)
XX(N1 + 2*II - 1) = SCRT2(2)
C      WRITE (ITAPEW,500) SCRT2(1),SCRT2(2)
CALL CLCORD (PROD, DISPPT(1,IND1), SCRT2)
XX(N1 + 2*II) = SCRT2(1)
XX(N1 + 2*II) = SCRT2(2)
C      WRITE (ITAPEW,500) SCRT2(1),SCRT2(2)
41 CONTINUE

```

510

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VIBRAP 458
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VIBRAP 514

```

```

      C
      C NOW DEFINE CURVE THROUGH THE DEFORMED BEAM
      C IF (NPTBM.EQ.2) GO TO 14
      JUMP = 1
      NCDEF(1) = (NPTBM - 1) * 24 /JUMP + 1
      N2 = NCDEF(1)
      CALL FERGCV (JUMP,DISPPT,NPTBM,COORD,N2)
      DO 38 II=1,N2
      CALL CLCORD (PROD, COORD(1,II), SCRT2)
      XX(N1 + 2*NPTBM + II) = SCRT2(1)
      XX2(N1 + 2*NPTBM + II) = SCRT2(2)
      WRITE (ITAPEW,500) SCRT2(1),SCRT2(2)
      38 CONTINUE
      C
      GO TO 15
      14 DO 16 II=1,2
      CALL CLCORD (PROD, DISPPT(1,II), SCRT2)
      XX(N1 + 2*NPTBM + II) = SCRT2(1)
      XX2(N1 + 2*NPTBM + II) = SCRT2(2)
      WRITE (ITAPEW,500) SCRT2(1),SCRT2(2)
      16 CONTINUE
      NCDEF(1) = 2
      15 CONTINUE
      C
      NSUM = NCOORD(1) + 2*NPTSBM(I) + NCDEF(1)
      C
      C WRITE UNSCALED VALUES OF Y ON UNIT MTAP1
      C DO 53 M=1,NSUM
      C     WRITE (MTAP1) XX(M)
      C     WRITE (ITAPEW,500) XX(M)
      53 CONTINUE
      C
      C WRITE ORIGINAL VALUES OF Z ON UNIT MTAP2
      C DO 56 M=1,NSUM
      C     WRITE (MTAP2) XX2(M)
      C     WRITE (ITAPEW,500) XX2(M)
      56 CONTINUE
      C
      IF (KNTR .GT. 1) GOTO 62
      560 C
      C COMPUTE LARGEST AND SMALLEST VALUES OF UNSCALED Y'S
      C (HORIZONTAL SCALE VARIABLES)
      C CALL ARAYMN (XX, NCOORD(I), YMIN(I))
      C CALL MAX (XX, NCOORD(I), YMAX(I))
      C
      C WRITE (ITAPEW, 500) YMIN(I)
      C WRITE (ITAPEW, 500) YMAX(I)
      570 C
      VIBRAP 515
      VIBRAP 516
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      VIBRAP 568
      VIBRAP 569
      VIBRAP 570
      VIBRAP 571

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SUBROUTINE VIBRAP 74/74 OPT=1

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```
C      WRITE (ITAPEW, 500) (XX(II),II=1,NSUM)          VIBRAP 572
C
C      COMPUTE LARGEST AND SMALLEST VALUES OF UNSCALED Z'S
C      (VERTICAL SCALE VARIABLES)                         VIBRAP 573
C
C      CALL ARAYMN (XX2, NCOORD(I), ZMIN(I))
C      CALL MAX (XX2, NCOORD(I), ZMAX(I))                VIBRAP 574
C
C      WRITE (ITAPEW, 500) ZMIN(I)                      VIBRAP 575
C      WRITE (ITAPEW, 500) ZMAX(I)                      VIBRAP 576
C      WRITE (ITAPEW, 500) (XX2(II),II=1,NSUM)           VIBRAP 577
C
C      62 CONTINUE                                         VIBRAP 578
C
C      REWIND MTAP1                                       VIBRAP 579
C      REWIND MTAP2                                       VIBRAP 580
C
C      IF (KNTR .GT. 1) GOTO 68
C      COMPUTE LARGEST Y AND Z VALUES FOR ALL BEAMS
C      (TO BE USED IN SCALING)                          VIBRAP 581
C
C      CALL MAX (YMAX, NBEAMS, BGSTY)
C      CALL MAX (ZMAX, NBEAMS, BGSTZ)
C      WRITE (ITAPEW,500) BGSTY, BGSTZ                 VIBRAP 582
C
C      COMPUTE SMALLEST Y AND Z VALUES FOR ALL BEAMS
C      (TO BE USED IN SCALING)                          VIBRAP 583
C
C      CALL ARAYMN (YMIN , NBEAMS, SMLSTY)
C      CALL ARAYMN (ZMIN , NBEAMS, SMLSTZ)
C      WRITE (ITAPEW,500) SMLSTY, SMLSTZ                VIBRAP 584
C
C      DY = (BGSTY - SMLSTY) / HSCALE
C      DZ = (BGSTZ - SMLSTZ + 2.*ABS(DSPMX1*PROD(2,3)))/ VSCALE
C
C      DSCALC = DY
C      IF (DZ .GT. DY) DSCALC = DZ
C      SHIFT = (10.0 - (DZ*VSCALE)/DY) / 2.
C      IF (DZ .GT. DY) SHIFT = (10.0 - VSCALE) / 2.
C      WRITE (ITAPEW, 500) DY, DZ
C
C      68 CONTINUE                                         VIBRAP 585
C
C      615
C
C      C1BM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      UNSCALED Y AND Z VALUES ARE READ OFF MTAP1 AND MTAP2
C      SCALED AND REWRITTEN ON MTAP8 AND MTAP9.
C
C      DO 80 I=1,NBEAMS
C      NPTS = 2*NPTSBM(I) + NCDEF(I) + NCDEF(I)
C      DO 81 II=1,NPTS
C      READ (MTAP1) YY
C      YY = (YY - SMLSTY) / DSCALC
C      WRITE (ITAPEW,500) YY
C      WRITE (MTAPB) YY
C
C      620
C
C      625
C
C      626
C
C      627
C
C      628
```

SUBROUTINE	VIBRAP	74/74	OPT=1	FTN 4 8+577	85/01/23 . 08 . 10 . 44	PAGE	12
C	READ (MTAP2) YY				VIBRAP	629	
C	YY = (YY - (SMLSTZ - ABS(DSPMX1*PROD(2,3)))/DSCALC + SHIFT				VIBRAP	630	
630	WRITE (ITAPEW,500) YY				VIBRAP	631	
C	CONTINUE				VIBRAP	632	
C	80 CONTINUE				VIBRAP	633	
C	REWIND MTAP1				VIBRAP	634	
635	REWIND MTAP2				VIBRAP	635	
C	REWIND MTAP8				VIBRAP	636	
C	REWIND MTAP9				VIBRAP	637	
CIBM	ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS				VIBRAP	638	
C					VIBRAP	639	
640					VIBRAP	640	
C					VIBRAP	641	
C	BEAMS ARE PLOTTED ONE AT A TIME				VIBRAP	642	
C					VIBRAP	643	
C					VIBRAP	644	
645	DO 60 I=1,NBEAMS				VIBRAP	645	
C	NPTS = NCOORD(I)				VIBRAP	646	
C	PLOT THE CURVE THROUGH THE UNDEFORMED BEAM FIRST				VIBRAP	647	
650	CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS				VIBRAP	648	
C	DO 61 M=1,NPTS				VIBRAP	649	
C	READ (MTAPB) U(M)				VIBRAP	650	
C	READ (MTAPB) V(M)				VIBRAP	651	
C	READ (MTAP9) U(M)				VIBRAP	652	
C	READ (MTAP9) V(M)				VIBRAP	653	
C	WRITE (ITAPEW,500) U(M), V(M)				VIBRAP	654	
655	61 CONTINUE				VIBRAP	655	
C	CALL LINE (U,V,NPTS,1,1,JL,S)				VIBRAP	656	
CIBM	ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS				VIBRAP	657	
C					VIBRAP	658	
660	CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				VIBRAP	659	
C	U(NPTS+1)=SMLSTY				VIBRAP	660	
C	U(NPTS+2)=DSCALC				VIBRAP	661	
665	V(NPTS+1)=SMLSTZ - ABS(DSPMX1 *PROD(2,3)) - SHIFT*DSCALC				VIBRAP	662	
C	V(NPTS+2)=DSCALC				VIBRAP	663	
C					VIBRAP	664	
670	DO 61 M=1,NPTS				VIBRAP	665	
C	READ(MTAP1) U(M)				VIBRAP	666	
C	READ(MTAP2) V(M)				VIBRAP	667	
675	61 CONTINUE				VIBRAP	668	
C	CALL LINE(U,V,NPTS,1,O,LN)				VIBRAP	669	
C					VIBRAP	670	
C	CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS				VIBRAP	671	
680	CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS				VIBRAP	672	
C	READ (MTAPB) U(1)				VIBRAP	673	
C	READ (MTAP9) V(1)				VIBRAP	674	
C	READ (MTAPB) U(2)				VIBRAP	675	
C	READ (MTAP9) V(2)				VIBRAP	676	
C	READ (MTAPB) U(3)				VIBRAP	677	
C	READ (MTAP9) V(3)				VIBRAP	678	
C	END				VIBRAP	679	

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685      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS          VIBRAP   686
C      CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS          VIBRAP   687
      READ(MTAP1) U(1)          VIBRAP   688
      READ(MTAP2) V(1)          VIBRAP   689
      READ(MTAP1) U(2)          VIBRAP   690
      READ(MTAP2) V(2)          VIBRAP   691
      U(1) = (U(1) - SMLSTY)/DSCALC          VIBRAP   692
      U(2) = (U(2) - SMLSTY)/DSCALC          VIBRAP   693
      V(1) = (V(1) - (SMLSTZ - ABS(DSPMX1*PROD(2,3))-
      SHIFT*DSCALC))/DSCALC          VIBRAP   694
      V(2) = (V(2) - (SMLSTZ - ABS(DSPMX1*PROD(2,3))-
      SHIFT*DSCALC))/DSCALC          VIBRAP   695
      VIBRAP   696
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS          VIBRAP   697
      C      DIST = SQRT((V(2) - V(1))*2 + (U(2) - U(1))*2)          VIBRAP   698
      C      WRITE (ITAPEW,500) DIST          VIBRAP   699
      NCYCL = DIST / (DASH + BLANK)          VIBRAP   700
      C      WRITE (ITAPEW, 1000) NCYCL          VIBRAP   701
      IF (NCYCL.EQ.0) GO TO 72          VIBRAP   702
      AT LEAST ONE DASH AND BLANK WILL BE DRAWN          VIBRAP   703
      ARG1 = V(2) - V(1)          VIBRAP   704
      ARG2 = U(2) - U(1)          VIBRAP   705
      ANGLE = ATAN2 (ARG1, ARG2)          VIBRAP   706
      CALL PLOT (U(1),V(1),3)          VIBRAP   707
      WRITE (ITAPEW,500) ANGLE          VIBRAP   708
      DO 73 IJ=1,NCYCL          VIBRAP   709
      IF (IJ.EQ.1) ULL = U(1)          VIBRAP   710
      IF (IJ.EQ.1) VLL = V(1)          VIBRAP   711
      UUL = ULL + O_14 * COS (ANGLE)          VIBRAP   712
      VUL = VLL + O_14 * SIN (ANGLE)          VIBRAP   713
      WRITE (ITAPEW,500) ULL,VLL,ULL,VUL          VIBRAP   714
      CALL PLOT (UUL,VUL,2)          VIBRAP   715
      UUL = UUL + .07 * COS (ANGLE)          VIBRAP   716
      VUL = VUL + .07 * SIN (ANGLE)          VIBRAP   717
      WRITE (ITAPEW,500) ULL,VLL,UUL,VUL          VIBRAP   718
      CALL PLOT (UUL,VUL,3)          VIBRAP   719
      ULL = UUL          VIBRAP   720
      VLL = VUL          VIBRAP   721
      73 CONTINUE          VIBRAP   722
      CALL PLOT (U(2),V(2),2)          VIBRAP   723
      GO TO 71          VIBRAP   724
      C      WRITE (ITAPEW,500) U(1), V(1), U(2), V(2)          VIBRAP   725
      VIBRAP   726
      C      72 CONTINUE          VIBRAP   727
      CALL PLOT (U(1),V(1),3)          VIBRAP   728
      CALL PLDT (U(2),V(2),2)          VIBRAP   729
      C      71 CONTINUE          VIBRAP   730
      C      DRAW A HEAVY CURVE THROUGH THE DEFORMED BEAM          VIBRAP   731
      C      FIRST READ POINTS DEFINING THE DEFORMED BEAM FROM I/O UNIT          VIBRAP   732
      C      NPTS = NCDEF(1)          VIBRAP   733
      C      VIBRAP   734
      C      735 C      VIBRAP   735
      C      VIBRAP   736
      C      VIBRAP   737
      C      VIBRAP   738
      C      VIBRAP   739
      C      VIBRAP   740
      C      VIBRAP   741
      C      VIBRAP   742
      C      RTM REGRANNING OF STATEMENTS ASSOCIATED WITH I/O UNIT COMPUTED PROGRAMS

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SUBROUTINE VIBRAP 74/74 OPT=1

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C DO 63 II=1,NPTS  
C READ (MTAPB) U(II)  
C READ (MTAP9) V(II)  
C WRITE (ITAPEW,500) U(II), V(II)  
C 63 CONTINUE  
C1BM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS  
CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS  
  
DO 63 II=1,NPTS  
READ(MTAP1) U(II)  
READ(MTAP2) V(II)  
63 CONTINUE  
CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS  
  
C NEXT DRAW THREE CURVES EACH SLIGHTLY DISPLACED FROM ONE ANOTHER  
C THROUGH THE DEFORMED BEAM  
C  
NPTSM1 = NPTS - 1  
DO 64 K=1,NPTSM1  
DO 65 J=1,3  
IF (J.EQ.1) GOTO 66  
ARG1 = V(K+1) - V(K)  
ARG2 = U(K+1) - U(K)  
ANGLE = ATAN2 (ARG1, ARG2)  
DU = .005 \* SIN(ANGLE)  
DV = .005 \* COS(ANGLE)  
IF, (J.EQ.3) DU = -DU  
IF (J.EQ.3) DV = -DV  
GO TO 67  
66 DU = 0  
DV = 0.  
  
C1BM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS  
C 67 U1(2) = U(K+1) - DU  
C V1(2) = V(K+1) + DV  
C U1(1) = U(K) - DU  
C V1(1) = V(K) + DV  
C CALL LINE (U1,V1,2,1,1,JL,S)  
C1BM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS  
CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS  
67 CONTINUE  
U1(2) = U(K+1) - DU\*DSCALC  
V1(2) = V(K+1) + DV\*DSCALC  
U1(1) = U(K) - DU\*DSCALC  
V1(1) = V(K) + DV\*DSCALC  
U1(3) = SMLSTY  
U1(4) = DSCALC  
V1(3) = SMLSTZ - ABS(OSPNX1\*PROD(2,3)) - SHIFT\*DSCALC  
V1(4) = DSCALC  
CALL LINE(U1,V1,2,1,O,LM)  
CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS  
C  
65 CONTINUE  
64 CONTINUE

SUBROUTINE VIBRAP 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 15  
 C C 60 CONTINUE VIBRAP 800  
 C C BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS VIBRAP 801  
 C REWIND MTAP8 VIBRAP 802  
 C REWIND MTAP9 VIBRAP 803  
 C C ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS VIBRAP 804  
 C CCDC REWIND MTAP1 VIBRAP 805  
 C REWIND MTAP2 VIBRAP 805  
 C CCDC 21 CONTINUE VIBRAP 806  
 C CALL DCLOSE(TUCOM) VIBRAP 807  
 C TERMINATE PLOTTING VIBRAP 808  
 C CALL PLOT(HSCLP4, 0., -3) VIBRAP 809  
 IF (KPILOT EQ. YES) GO TO 9500 VIBRAP 810  
 LEFT=LINES-KOUNT VIBRAP 811  
 IF(LEFT.LT.2) KOUNT=LINES VIBRAP 812  
 CALL TITLES (2) VIBRAP 813  
 CALL PLB (.1, ITAPEW) VIBRAP 814  
 WRITE(ITAPEW,9017) VIBRAP 815  
 COUNT=COUNT+2 VIBRAP 816  
 9500 CONTINUE VIBRAP 817  
 C CALL TIMEB (36,36HFROM VIBRAP - PLOT VIBRATION RESULTS) VIBRAP 818  
 C FORMATS VIBRAP 819  
 C 9000 FORMAT(18A4) VIBRAP 820  
 9001 FORMAT(10X, 18A4) VIBRAP 821  
 9002 FORMAT(3E15.5) VIBRAP 822  
 9003 FORMAT(10I5) VIBRAP 823  
 9004 FORMAT(10X, 10(1H\*), 25HGEOOMETRY OF PLOTTING GRID,1O(1H\*), VIBRAP 824  
 1 //, 10X, 3H PT, 16X, 1HX:20X, 1HY, 20X, 1HZ, 15X, 3HD0F, /) VIBRAP 825  
 9005 FORMAT(15.3E15.5) VIBRAP 826  
 9006 FORMAT(10X, I3, 3(10X, 1PE11.4), 10X, A4) VIBRAP 827  
 9007 FORMAT(2A4, 2X, E10.3) VIBRAP 828  
 9008 FORMAT(2A4, 2X, 15) VIBRAP 829  
 9009 FORMAT(/, 10X, 10(1H\*), 16HBEAM DEFINITIONS, 1O(1H\*), VIBRAP 830  
 1 //, 10X, 5H NO., 3X, 5HTITLE, 8X, 16HCONNECTING NODES, 84(1H)./) VIBRAP 831  
 9010 FORMAT(10X, I5, 3X, 2A4, 5X, 20I5) VIBRAP 832  
 9011 FORMAT(/, 10X, 15, 3X, 29HTHE SELECTED REFERENCE BEAM (.2A4, VIBRAP 833  
 1 18H) HAS A LENGTH OF .F10.3. VIBRAP 834  
 2 //, 10X, 44HRATIO OF MAX DISPLACEMENT TO REFERENCE BEAM . VIBRAP 835  
 3 8HLENGTH = F8.3./ VIBRAP 836  
 9012 FORMAT (10X, 13HTHE FOLLOWING, 13., 2X, 25HMODES WILL BE PLOTTED...) VIBRAP 837  
 9013 FORMAT(./, (10X, 14I5)) VIBRAP 838  
 9014 FORMAT(./, 10X, 10(1H\*), 29HDISPLACEMENTS FOR MODE NUMBER.I3.1H . VIBRAP 839  
 1 10(1H\*), PT NTSPHACFMFNT) / VIBRAP 840  
 2 // 10X 5(10H VIBRAP 841  
 3 PT NTSPHACFMFNT) / VIBRAP 842  
 455 VIBRAP 843  
 456 VIBRAP 844  
 457 VIBRAP 845  
 458 VIBRAP 846  
 459 VIBRAP 847  
 460 VIBRAP 848  
 461 VIBRAP 849  
 462 VIBRAP 850  
 463 VIBRAP 851  
 464 VIBRAP 852  
 465 VIBRAP 853  
 466 VIBRAP 854  
 467 VIBRAP 855  
 468 VIBRAP 856

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SUBROUTINE VIBRAP    74/74   OPT=1

      9014 FORMAT(10X,5(17.1PE
      9015 FORMAT('/',10X,
      1          25H
      2          34H
      3          37H
      4          45H
      6H
      9016 FORMAT(10X,37HINITI
      9017 FORMAT(10X,3GHTERMI
      C
      C
      860           RETURN
      END

      865           C

      SYMBOLIC REFERENCE MAP (R=3)
      ENTRY POINTS      DEF LINE      REFERENCES
      3      VIBRAP      1            866
      VARIABLES         SN  TYPE      RELOCATION
      2727  A        REAL        ARRAY
      2716  ANGLE     REAL
      2714  ARG1      REAL
      2715  ARG2      REAL
      2740  B        REAL        ARRAY
      2642  BEAML     REAL
      2641  BEAML2    REAL
      2677  BGSTY    REAL
      2700  BGSTZ    REAL
      2577  BLANK     REAL
      10424  BMREF    REAL
      7424  BUFFER   REAL
      2751  C        REAL        ARRAY
      4671  COORD    REAL        ARRAY
      2576  DASH     REAL
      2617  DEGTOR   REAL
      10426  DISP     REAL        ARRAY
      2664  DISPMX   REAL        ARRAY
      13526  DISPPT   REAL
      2712  DIST     REAL        ARRAY
      12066  DOF      REAL
      2705  DSCALC   REAL
      2643  DSPMX1   REAL

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14.	VIBRAP	857		
Y OR Z,	VIBRAP	858		
THIS POINT,	VIBRAP	859		
MENT WILL BE SET TO.	VIBRAP	860		
VIBRAP)	VIBRAP	861		
VIBRAP)	VIBRAP	862		
VIBRAP	VIBRAP	863		
VIBRAP	VIBRAP	864		
VIBRAP	VIBRAP	865		
VIBRAP	VIBRAP	866		
VIBRAP	VIBRAP	867		
VIBRAP	VIBRAP	868		
86	175	256	DEFINED	232
236	715	719	DEFINED	233
767	767	768	DEFINED	233
767	DEFINED	706	765	
767	DEFINED	707	766	
86	176	253	DEFINED	240
243	346	327	DEFINED	
DEFINED	326			
605	606	116	DEFINED	
606	346	295	DEFINED	
DEFINED	2*318			
161	87	177	DEFINED	
250	2*84	187	DEFINED	
DEFINED	115	475	DEFINED	
226	227	475	DEFINED	
189	386	401	DEFINED	
DEFINED	379	386	DEFINED	
412	188	508	DEFINED	
440	441	520	DEFINED	
451	452	443	DEFINED	
DEFINED	700	453	DEFINED	
190	289	431	DEFINED	
664	665	432	DEFINED	
788	789	692	DEFINED	
609	606	791	DEFINED	
606	664	693	DEFINED	
		792	DEFINED	
		793	DEFINED	
		696	DEFINED	
		792	DEFINED	
		2*694	DEFINED	
		793	DEFINED	

SUBROUTINE	VIBRAP	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23 . 08 . 10 . 44	PAGE	17
VARIABLES								
2725	DU	REAL			REFS	770	770	773
2726	DV	REAL			REFS	771	779	774
2703	DY	REAL			REFS	608	609	610
2704	DZ	REAL			REFS	2*609	610	611
2600	HSCALE	REAL			REFS	124	605	DEFINED
2602	HSCLP4	REAL			REFS	370	819	DEFINED
2603	I	INTEGER			REFS	2*262	122	124
					REFS	474	313	354
2604	IBUFD	INTEGER			REFS	492	493	518
13622	IDISP	INTEGER	ARRAY	PLACES	REFS	2*577	519	535
21	IFA	INTEGER		PLACES	REFS	141	2*578	677
67	IFADDI	INTEGER		PLACES	REFS	421	260	739
41	IFADDI	INTEGER		PLACES	REFS	367	282	305
33	IFB	INTEGER		PLACES	REFS	367	645	351
71	IFBAL	INTEGER		PLACES	REFS	161	DEFINED	354
43	IFBALI	INTEGER		PLACES	REFS	32	376	359
117	IFBR	INTEGER		PLACES	REFS	32	DEFINED	359
53	IFBT	INTEGER		PLACES	REFS	61	376	359
2645	IFCOM	INTEGER		PLACES	REFS	341	158	359
73	IFDEF	INTEGER		PLACES	REFS	341	DEFINED	359
45	IFDESI	INTEGER		PLACES	REFS	341	376	359
55	IFDESN	INTEGER		PLACES	REFS	341	376	359
35	IFDESO	INTEGER		PLACES	REFS	341	376	359
21	IFDLT	INTEGER		PLAYFF	REFS	341	376	359
3	IFDLTI	INTEGER		PLAYFF	REFS	341	376	359
77	IFDUM1	INTEGER		PLAYFF	REFS	341	376	359
101	IFDUM2	INTEGER		PLAYFF	REFS	341	376	359
103	IFDUM3	INTEGER		PLAYFF	REFS	341	376	359
141	IFINCK	INTEGER		PLAYFF	REFS	341	376	359
137	IFINCM	INTEGER		PLAYFF	REFS	341	376	359
31	IFKS	INTEGER		PLAYFF	REFS	341	376	359
105	IFL	INTEGER		PLAYFF	REFS	341	376	359
115	IFLR	INTEGER		PLAYFF	REFS	341	376	359
57	IFMD	INTEGER		PLAYFF	REFS	341	376	359
65	IFMDB	INTEGER		PLAYFF	REFS	341	376	359
37	IFMDB1	INTEGER		PLAYFF	REFS	341	376	359
1	IFMDFF	INTEGER		PLAYFF	REFS	341	376	359
61	IFMEMF	INTEGER		PLAYFF	REFS	341	376	359
25	IFMPL	INTEGER		PLAYFF	REFS	341	376	359
7	IFMPLI	INTEGER		PLAYFF	REFS	341	376	359
51	IFMEMO	INTEGER		PLAYFF	REFS	341	376	359
125	IFMODK	INTEGER		PLAYFF	REFS	341	376	359
123	IFMODM	INTEGER		PLAYFF	REFS	341	376	359
15	IFMPL	INTEGER		PLAYFF	REFS	341	376	359
127	IFPHT	INTEGER		PLAYFF	REFS	341	376	359
13	IFPATF	INTEGER		PLAYFF	REFS	341	376	359
135	IPPH	INTEGER		PLAYFF	REFS	341	376	359
27	IPPHA	INTEGER		PLAYFF	REFS	341	376	359
31	IPPHAT	INTEGER		PLAYFF	REFS	341	376	359
121	IPPHTF	INTEGER		PLAYFF	REFS	341	376	359
133	IFQ	INTEGER		PLAYFF	REFS	341	376	359
23	IFQA	INTEGER		PLAYFF	REFS	341	376	359
25	IFQAT	INTEGER		PLAYFF	REFS	341	376	359
131	TFOT	INTEGER		PLAYFF	REFS	341	376	359

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VARIABLES	SN	TYPE	RELOCATION
11	IFSCR	INTEGER	PLACES
17	IFSLT	INTEGER	PLAYFF
5	IFSLTI	INTEGER	PLAYFF
27	IFSTFN	INTEGER	PLACES
63	IFSTFO	INTEGER	PLACES
12	IFS1	INTEGER	PLACES
13	IFS2	INTEGER	PLACES
14	IFS3	INTEGER	PLACES
15	IFS4	INTEGER	PLACES
11	IFTPGT	INTEGER	PLAYFF
75	IFWT	INTEGER	PLACES
47	IFWTI	INTEGER	PLACES
23	IFY	INTEGER	PLACES
107	IFYT	INTEGER	PLACES
111	IFZ	INTEGER	PLACES
113	IFZR	INTEGER	PLACES
2666	II	INTEGER	REFS
2717	IJ	INTEGER	441
2661	IM	INTEGER	443
2673	INDX	INTEGER	452
2674	IND1	INTEGER	453
2	ITAPEP	INTEGER	502
0	ITAPER	INTEGER	502
0	ITAPER	INTEGER	503
0	ITAPES	INTEGER	503
7	ITAPET	INTEGER	503
1	ITAPEW	INTEGER	508
2605	ITAP60	INTEGER	53
20	IUA	INTEGER	53
66	IUADD	INTEGER	53
40	IUADDI	INTEGER	53
32	IUB	INTEGER	53
70	IUBAL	INTEGER	53
42	IUBAL1	INTEGER	53
116	IUBR	INTEGER	53
52	IUBT	INTEGER	53
16	IUCD	INTEGER	53
2644	IUCOM	INTEGER	53
72	IUDESF	INTEGER	53
44	IUDESI	INTEGER	53
54	IUDESN	INTEGER	53
34	IUDESO	INTEGER	53
20	IUDLT	INTEGER	53
2	IUDLT1	INTEGER	53
76	IUDUM1	INTEGER	53
100	IUDUM2	INTEGER	53
102	IUDUM3	INTEGER	53
4	IUGO1	INTEGER	53
5	IUGO2	INTEGER	53



ROUTINE	VARIABLES	SN	TYPE	RELOCATION	74/74 OPT=1
VIBRAP	7 KBPAGE 0 KFREE 4 KLABEL 2653 KNTR		INTEGER INTEGER INTEGER INTEGER	CLIST CLIST CLIST CLIST	
	O KOUNT		INTEGER	CLIST	
	11 KOUNTH 12 KOUNTI 1 KPAGE 0 KPILOTF 0 KPILOTS 0 KPILOTV 0 KTABLE 0 KTABLO 5 KTPAGE 2657 L 2670 LEFT 2 LINES		INTEGER INTEGER INTEGER INTEGER INTEGER INTEGER INTEGER INTEGER INTEGER INTEGER INTEGER	*UNUSED CLIST CLIST F.P. CPLOTS F.P. CTABLE CTABLE CLIST	
	10 LINSEG 3 LINEST 2710 LM 2676 M		INTEGER INTEGER INTEGER INTEGER	CLIST CLIST	
	2611 MAX1 2612 MAX2 2613 MAX3 2652 MODE 2727 MPLOT		INTEGER INTEGER INTEGER INTEGER INTEGER	CLIST CLIST	
	2572 MITAP1 2573 MITAP2 2574 MITAP3 2575 MITAP4 26562 NAME 2627 NBEAMS		INTEGER INTEGER INTEGER INTEGER ARRAY	CLIST CLIST	
	2624 NC 16217 NCOLF 2651 NCDI		INTEGER INTEGER INTEGER	CTABLE CTABLE	
	2647 NCOL 3 NCOLS 4 NCUST 15306 NCODR		INTEGER INTEGER INTEGER INTEGER	CTABLE CTABLE	
	2713 NCVCL 2634 NNDP1 NNDP2		INTEGER INTEGER INTEGER	CTABLE CTABLE	

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338	339				
369	384	559	590		
140	148	278	280	285	287
311	314	347	353	355	397
434	438	821	826		
140	148	278	280	287	290
314	344	347	353	355	395
435	438	822	826		
285	309	397			
DEFINED 146	DEFINED <sup>1</sup>	147			
2*401 822 138	DEFINED DEFINED 303	376 434 344	401 821 390	434	435
794	668	669	DEFINED	546	554
189	190	DEFINED	172		
191	192	DEFINED	173		
188	DEFINED 367 2*86	174 372 87	398 88	363 354	366 384
I/O REFS 809	I/O REFS 810	I/O REFS 810	547	587	668
I/O REFS 341	I/O REFS 421	I/O REFS 594	555	588	669
DEFINED 519	DEFINED 380	125 126 127	316	317	420
I/O REFS 341	I/O REFS 421	I/O REFS 594	595	601	602
DEFINED 519	DEFINED 380	274 540 385	739 2*395	DEFINED 403	518
368	378				
474	493	540	565	566	577
DEFINED 711	DEFINED 711	467 325	492 702	DEFINED 321	DEFINED 321

SUBROUTINE FERGCV    74/74    OPT=1

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```
16   COORD(J, NP)=CPOINT(J, N)
      RETURN
      END
     60
```

FERGCV    59  
FERGCV    60  
FERGCV    61

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
3    FERGCV	1	59				
VARIABLES	SN	TYPE	RELOCATION			
O    COORD		REAL	ARRAY	REFS	8	DEFINED
O    CPOINT		REAL	ARRAY	REFS	8	2*35
			F. P.	DEFINED	1	54
			F. P.	REFS	9	56
253    F1		REAL	ARRAY	REFS	10	DEFINED
302    GO		REAL	ARRAY	REFS	10	2*56
245    I		INTEGER		REFS	3*35	14
				REFS	53	4*36
				REFS	54	7*39
246    J		INTEGER		REFS	46	5*56
				DEFINED	46	3*42
250    JJ		INTEGER		REFS	3*35	33
0    JUMP		INTEGER		REFS	37	3*45
252    K		INTEGER		REFS	2*55	38
242    L		INTEGER		REFS	25	41
251    M		INTEGER		REFS	26	2*49
0    N		INTEGER		REFS	26	44
0    NCOORD		INTEGER	*UNUSED	REFS	54	
243    NM		INTEGER		REFS	28	
				DEFINED	54	
244    NP		INTEGER		REFS	29	
240    PCT		REAL		REFS	50	
331    S		REAL	ARRAY	REFS	50	
				DEFINED	55	
354    T		REAL	ARRAY	REFS	53	
				REFS	53	
247    TEMP		REAL		REFS	58	
450    V		REAL	ARRAY	REFS	58	
				DEFINED	58	
EXTERNALS	TYPE	ARGS	LIBRARY	REFERENCES	47	
		1				
STATEMENT LABELS		DEF LINE	REFERENCES			
0    10		36	33			
0    11		35	34			
0    12		39	37			
0    13		42	41			
0    14		45	44			
0    15		49	46			
0    16		58	51			
0    17		56	52			

```

1      SUBROUTINE FERGCV(JUMP,CPOINT,N,COORD,COORD)
2      C   24/JUMP IS THE NUMBER OF INTERVALS IN INTERPOLATION.
3      C   CPOINT(3,20) CONTAINS THE COORDINATES TO BG FIT
4      C   N IS NUMBER OF POINTS TO BE USED FROM CPOINT
5      C   COORD(3,COORD) CONTAINS COORDINATES OF CURVE FIT
6      C   COORD SHOULD BE (N-1)*24/JUMP+1
7      C
8      DIMENSION COORD(3,1)          .CPOINT(3,1)
9      DIMENSION F1(23)             .CPOINT(3,1)
10     DIMENSION GO(23)            .CPOINT(3,1)
11     DIMENSION S(19)             .CPOINT(3,1)
12     DIMENSION T(3,20)            .CPOINT(3,1)
13     DIMENSION V(3,19)            .CPOINT(3,1)
14     DATA GO / 03827., 07002., 09570., 11574., 13057., 14063.,
15       14634., 14815., 14648., 14178., 13448., 12500.,
16       11379., 10127., 08789., 07407., 06026., 04688.,
17       03436., 02315., 01367., 00637., 00166/
18     DATA F1 / 00506., 01968., 04297., 07407., 11212., 15625.,
19       20558., 25926., 31641., 37616., 43764., 50000.,
20       56236., 62384., 68359., 74074., 79442., 84375.,
21       88788., 92593., 95703., 98032., 99494/
22     DATA PCT /0.90/
23     C 20=MAXIMUM NUMBER OF POINTS ON A BEAM
24     C 19=MAXIMUM-1
25     C L=24/JUMP
26     C IF (L*NJUMP NE 24)L=4
27     C JUMP SHOULD BE DIVISOR OF 24
28     C NM=N-1
29     C NP=NM*L+1
30     C GET THE DISTANCE BETWEEN CONSECUTIVE NODE PTS.
31     C
32     DO 10 I=1,NM
33     DO 11 J=1,3
34     V(J,I)=CPOINT(J,I+1)-CPOINT(J,I)
35     10 S(I)=SORT(V(1,1)**2+V(2,1)**2+V(3,1)**2)
36     DO 12 J=1,3
37     DO 12 I=2,NM
38     T(J,I)=(S(I)*V(J,I-1)+S(I-1)*V(J,I))/(S(I)+S(I-1))
39     TEMP=(V(1,1)*T(1,2)+V(2,1)*T(2,2)+V(3,1)*T(3,2))/(S(1)**2)
40     DO 13 I=1,3
41     T(I,1)=2.*V(I,1)*TEMP-T(I,2)
42     TEMP=(V(1,NM)*T(1,NM)+V(2,NM)*T(2,NM)+V(3,NM)*T(3,NM))/S(NM)**2
43     DO 14 I=1,3
44     T(I,N)=2.*V(I,NM)*TEMP-T(I,NM)
45     DO 15 I=1,N
46     TEMP=PCT/SQRT((T(1,1)**2+T(2,1)**2+T(3,1)**2)
47     DO 15 J=1,3
48     T(J,I)=T(J,I)*TEMP
49     JJ=24/L
50     DO 16 J=1,3
51     DO 17 I=1,NM
52     M=(I-1)*L+1
53     COORD(J,M)=CPOINT(J,I)
54     DO 17 K=JJ,23,JJ
55     COORD(J,M+K/JJ)=S(I)*(T(J,I)*GO(K)-T(J,I+1)*GO(24-K))
56     COORD(J,M+K/JJ)+CPNTNT(I-1,I)+V(I,I)*F1(K)
57
58

```

SUBROUTINE CLCORD

74/74 OPI=1

FTN 4.8+577

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```

1      C      SUBROUTINE CLCORD (PROD, VEC, ANS)
          SUBROUTINE TO TRANSFORM COORDINATES TO CALCOMP COORDINATES:
          DIMENSION PROD(2,1)           VEC(3,1) ,
          CALL MCMULT (PROD, VEC, ANS, 2, 3, 2)
          RETURN
          END

```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	LINE	REFERENCES
3	CLCORD	1	5	

VARIABLES	SN	TYPE	RELOCATION	REFS
O ANS		REAL	ARRAY F.P.	3
O PROD		REAL	ARRAY F.P.	3
O VEC		REAL	ARRAY F.P.	3

EXTERNALS	TYPE	ARGS	REFERENCES
MCMULT		6	4

STATISTICS	PROGRAM LENGTH	25B	21
	52000B CM USED		

		CLCORD	2
		CLCORD	3
		CLCORD	4
		CLCORD	5
		CLCORD	6
		CLCORD	7

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```

SUBROUTINE MAX      74/74   OPT=1           FTN 4.8+577    85/01/23. 08.10.44
1
      SUBROUTINE MAX (VEC, MID, ANS)
      DIMENSION VEC(1)
      ANS = VEC(1)
      DO 1 I=2, MID
      IF (VEC(I).GT.ANS) ANS = VEC(I)
1    CONTINUE
      RETURN
      END

```

SUBROUTINE MAX (VEC, MID, ANS)

```

      DIMENSION VEC(1)
      ANS = VEC(1)
      DO 1 I=2, MID
      IF (VEC(I).GT.ANS) ANS = VEC(I)
1    CONTINUE
      RETURN
      END

```

MAX 2  
MAX 3  
MAX 4  
MAX 5  
MAX 6  
MAX 7  
MAX 8  
MAX 9

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
3 MAX	1	7				
VARIABLES	SN	TYPE	RELOCATION			
0 ANS		REAL	F.P.	REFS	5	DEFINED 1
22 I		INTEGER		REFS	2*5	DEFINED 1
0 MID		INTEGER	F.P.	REFS	4	DEFINED 1
0 VEC		REAL	ARRAY F.P.	REFS	2	DEFINED 1
STATEMENT LABELS	DEF LINE	REFERENCES				
C 1	6	4				
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
14 1	1	1	4 6	4B	INSTACK	
STATISTICS						
PROGRAM LENGTH			25B	21		
520000B CM USED						

SUBROUTINE	ARAYMN	74/74	OPT=1	FTN 4 8+577	85/01/23	08.10.44	PAGE
1	C	SUBROUTINE ARAYMN (VEC, MID, ANS)					1
		SUBROUTINE TO GET THE MINIMUM VALUE OF AN ARRAY					
		DIMENSION VEC(1)					
5	ANS = VEC(1)	DO 1 I=2,MID					
		IF (VEC(I).LT.ANS) ANS = VEC(I)					
		1 CONTINUE					
		RETURN					
		END					

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	
3 ARAYMN	1	8	6
VARIABLES	SN TYPE	RELOCATION	
O ANS	REAL	F.P.	
I MID	INTEGER	REFS	1
O MID	INTEGER	REFS	4
O VEC	REAL	REFS	5
	ARRAY	REFS	5
	F.P.	REFS	1
	F.P.	REFS	2*6
STATEMENT LABELS	DEF LINE	REFERENCES	
O 1	1	7	5
LOOPS	LABEL INDEX	FROM-TO	LENGTH
14 1	I	5 7	4B
STATISTICS	PROGRAM LENGTH	USED	PROPERTIES
	520000B CM	258	INSTACK

SUBROUTINE ARAYMX 74/74 OPT=1

FTN 4.8+577

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```

1      C   SUBROUTINE ARAYMX (VEC,MID,ANS)
2      C   SUBROUTINE WHICH COMPUTES THE LARGEST ABSOLUTE VALUE OF AN ARRAY
3      C   DIMENSION VEC(1)
4      KEY = 0
5      DO 1 I=1,MID
6          IF (VEC(I) EQ. 0.) GOTO 1
7          IF (KEY.NE.0) GO TO 2
8          ANS = ABS(VEC(I))
9
10         KEY = 1
11         GO TO 1
12         2 IF (ABS(VEC(I)).GT.ANS) ANS = ABS(VEC(I))
13         1 CONTINUE
14         RETURN
15         END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES					
3 ARAYMX	1	13					
VARIABLES	SN	TYPE	RELOCATION				
0 ANS		REAL	F.P.	REFS	11	DEFINED	1
26 I		INTEGER		REFS	6	DEFINED	8
25 KEY		INTEGER		REFS	7	DEFINED	2*11
0 MID		INTEGER		REFS	5	DEFINED	4
0 VEC		REAL	ARRAY	REFS	3	DEFINED	1
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES			
ABS	REAL	1	INTRIN	8			
STATEMENT LABELS			DEF LINE	REFERENCES			
23 1			12	5			
20 2			11	7			
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
14 1	I	5 12	10B	OPT			
STATISTICS							
PROGRAM LENGTH							
52000B CM USED			32B	26			

```

1      SUBROUTINE MCMULT      74/74    OPT=1           FTN 4.8+577      85/01/23. 08. 10.44      PAGE 1
      SUBROUTINE MCMULT (A,B,C,NRA,NCA,IDA)
      DIMENSION A(IDA,1),B(1),C(1)
      DO 100 I=1,NRA
      C(I) = 0.
      DO 100 J=1,NCA
      100 C(I) = C(I) + A(I,J) * B(J)
      RETURN
      END

```

```

1      SUBROUTINE MCMULT (A,B,C,NRA,NCA,IDA)
2      DIMENSION A(IDA,1),B(1),C(1)
3      DO 100 I=1,NRA
4      C(I) = 0.
5      DO 100 J=1,NCA
6      100 C(I) = C(I) + A(I,J) * B(J)
7      RETURN
8      END
9      MCMULT

```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS MCMLII DEF LINE REFERENCES 7

VARIABLES	SN	TYPE	RELOCATION
O A		REAL	F.P.
O B		REAL	F.P.
O C		REAL	F.P.
31 I	31	INTEGER	
O IDA	0	INTEGER	F.P.
32 J	32	INTEGER	F.P.
O NCA	0	INTEGER	F.P.
O NPA	0	INTEGER	F.P.

STATISTICS  
PROGRAM L

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```

100 C(I) = C(I) + A(I,J) * B(J)
      RETURN
      END

```

6 DEFINED 1  
6 DEFINED 1  
6 DEFINED 1  
3 \* 6 DEFINED 1  
DEFINED 5  
DEFINED 1  
DEFINED 1

```

SUBROUTINE MMULT          74/74   OPT=1           FTN 4.8+577    85/01/23. 08. 10.44    PAGE 1
SUBROUTINE MMULT (A,B,C,NRA,NCA,NCB,IDA,IDB,IDC)
DIMENSION A(IDA,1) .      B(IDB,1) .      C(IDC,1)
DO 100 I=1,NRA           DO 100 J=1,NCB
DO 100 K=1,NCA           C(I,J) = 0.
100 C(I,J) = C(I,J) + A(I,K)*B(K,J)
RETURN
END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	MNULT	DEF LINE	REFERENCES	
VARIABLES	SN	TYPE	RELOCATION	
0 A		REAL	ARRAY F.P.	DEFINED 1
0 B		REAL	ARRAY F.P.	DEFINED 1
0 C		REAL	ARRAY F.P.	DEFINED 1
50 I		INTEGER	ARRAY F.P.	DEFINED 3
0 IDA		INTEGER	F.P.	DEFINED 1
0 IDB		INTEGER	F.P.	DEFINED 1
0 IDC		INTEGER	F.P.	DEFINED 1
51 J		INTEGER	F.P.	DEFINED 4
52 K		INTEGER	F.P.	DEFINED 6
0 NCA		INTEGER	F.P.	DEFINED 1
0 NCB		INTEGER	F.P.	DEFINED 1
0 NRA		INTEGER	F.P.	DEFINED 1
STATEMENT LABELS				
0 100			DEF LINE REFERENCES	
			7 3 4	6
LOOPS	LABEL	INDEX	FROM-TO LENGTH	PROPERTIES
14	100	I	3 7	NOT INNER
15	100	J	4 7	NOT INNER
33	100	K	6 7	INSTACK
STATISTICS				
PROGRAM LENGTH	52000	CM USED	638	51

SUBROUTINE VIBRAP      74/74      OPT=1  
EQUIV CLASSES   LENGTH      MEMBERS - BIAS NAME(LENGTH)  
U      1371      O COORD (1371)      FTN 4.8+577      85/01/23. 08.10.44      PAGE 26

STATISTICS  
PROGRAM LENGTH      265778      11647  
CM LABELED COMMON LENGTH      3108      200  
52000B CM USED

COMMON	BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	74/74	OPT = 1	FTN 4.8+577	85/01/23 . 08 . 10 . 44	PAGE	25
CPLOTS	1		0 KPLOTS (1)			1 YES (1)	2 LINES (1)		
CONSTS	2		0 NO (1)			1 KPAGE (1)	2 LINES (1)		
CLIST	11		0 KOUNT (1)			4 KLABEL (1)	5 KTPAGE (1)		
			3 LINEST (1)			7 KBPAGE (1)	8 LINESG (1)		
CTABLE	8		6 NPAGEA (1)			10 KOUNTI (1)			
			9 KOUNTH (1)			1 NPASS (1)		2 NROWS (1)	
PLACES	98		0 KTABLE (1)			4 NCOLST (1)		5 KTABLO (1)	
			3 NCOLS (1)			7 ITAPET (1)			
			6 NPAGEA (1)			1 JUIN2 (1)		2 IUOUT1 (1)	
			3 IUDOUT2 (1)			4 IUGO1 (1)		5 IUGO2 (1)	
			6 IUGO3 (1)			7 IUGO4 (1)		8 IUSCR (1)	
			9 IFSCR (1)			10 IFS1 (1)		11 IFS2 (1)	
			12 IF53 (1)			13 IFS4 (1)		14 IUCD (1)	
			15 IUPR (1)			16 IUA (1)		17 IFA (1)	
			18 IUY (1)			19 IFY (1)		20 IUMEMN (1)	
			21 IFMEMN (1)			22 IUSTFN (1)		23 IUSTFN (1)	
			24 IUKS (1)			25 IFKS (1)		26 IUB (1)	
			27 IFB (1)			28 IUDESO (1)		29 IODESO (1)	
			30 IUMDBI (1)			31 IFMDBI (1)		32 IUDADI (1)	
			33 IFADDI (1)			34 IUBALI (1)		35 IUBALI (1)	
			36 IUDESI (1)			37 IUFDESI (1)		38 IWTI (1)	
			39 IFWTI (1)			40 IUMEMO (1)		41 IFMEMO (1)	
			42 IUBT (1)			43 IFBT (1)		44 IUDEN (1)	
			45 IFDESN (1)			46 IUMD (1)		47 IFMD (1)	
			48 IUMEMF (1)			49 IFMEMF (1)		50 IUSTFO (1)	
			51 IFSTFO (1)			52 IUMDB (1)		53 IFMDB (1)	
			54 IUADD (1)			55 IFADD (1)		56 IUBAL (1)	
			57 IFBAL (1)			58 IUDESF (1)		59 IFDEF (1)	
			60 IUNT (1)			61 IFWT (1)		62 IUDUM1 (1)	
			63 IFDUM1 (1)			64 IUDUM2 (1)		65 IUDUM2 (1)	
			66 IUDUM3 (1)			67 IUDUM3 (1)		68 IUL (1)	
			69 IFIL (1)			70 IUYT (1)		71 IFYT (1)	
			72 IUZ (1)			73 IFZ (1)		74 IUZR (1)	
			75 IFZR (1)			76 IULR (1)		77 IFRLR (1)	
			78 IUBR (1)			79 IFBR (1)		80 IUPHTF (1)	
			81 IFPHTF (1)			82 IUMODM (1)		83 IFMODM (1)	
			84 IUMODK (1)			85 IFMODK (1)		86 IUPHT (1)	
			87 IFPHHT (1)			88 IUQT (1)		89 IFQT (1)	
			90 IUQ (1)			91 IFQ (1)		92 IUPH (1)	
			93 IFPH (1)			94 IUIINC (1)		95 IFINCM (1)	
			96 IUNICK (1)			97 IFINCK (1)			
			0 IUMOFF (1)			1 IFMDFF (1)		2 IUDLT (1)	
			3 IFDLTI (1)			4 IUSLTI (1)		5 IFSLTI (1)	
			6 IUMPLI (1)			7 IFMPLI (1)		8 IUPGT (1)	
			9 IFTPGT (1)			10 IUPATF (1)		11 IFPATF (1)	
			12 IUMPL (1)			13 IFMPL (1)		14 IUSLT (1)	
			15 IFSLT (1)			16 IUDLT (1)		17 IFDLT (1)	
			18 IUOA (1)			19 IFQA (1)		20 IUQAT (1)	
			21 IFQAT (1)			22 IUPHA (1)		23 IFPHA (1)	
			24 IUPHAT (1)			25 IFPHAT (1)			
			0 KFREE (1)						
PLAYFF	26		MEMBERS - BIAS NAME(LENGTH)			O TITLE (18)			
EQUIV CLASSES	LENGTH		40			O TITLE (18)			
M PLOT						457 VV (457)			
UU			954			9 B (9)			

SUBROUTINE VBRAP		74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE	24
STATEMENT LABELS		DEF LINE	REFERENCES				
1323 72		729	704				
0 73		724	711				
75 77		164	146				
537 90		392	403				
554 92		400	397				
7 100		95	96				
2363 9000	FMT	834	95	142			
2365 9001	FMT	835	143				
2367 9002	FMT	836	222				
2371 9003	FMT	837	274	302			
2373 9004	FMT	838	279	286			359
2405 9005	FMT	840	283				
2410 9006	FMT	841	289				
2414 9007	FMT	842	295				
2417 9008	FMT	843	306				
2421 9009	FMT	844	310				
2433 9010	FMT	846	313				
2436 9011	FMT	847	346				
2455 9012	FMT	851	354				
2465 9013	FMT	853	398				
2500 9014	FMT	856	401				
2503 9015	FMT	857	437				
2526 9016	FMT	862	150				
2534 9017	FMT	863	825				
1466 9500		827	820				
LOOPS	LABEL	INDEX	FROM TO	LENGTH	PROPERTIES	EXT REFS	
50	1	I	141 144	7B		NOT INNER	
231	10	I	260 262	15B	INSTACK		
240	10	J	261 262	3B			
262	20	I	282 291	34B		EXT REFS	
325	30	I	305 329	65B		EXT REFS	
465	21	KNTR	364 813	757B		EXT REFS	NOT INNER
472	48	I	367 368	5B	INSTACK	EXT REFS	
532	28	IM	385 387	2B			
560	L		401 401	7B		EXT REFS	
603	18	II	414 417	3B	INSTACK	EXT REFS	NOT INNER
612	62	I	421 585	311B			
624	31	II	426 456	70B		EXT REFS	
726	32	II	477 483	11B		EXT REFS	
741	13	II	486 491	11B		EXT REFS	
757	41	II	501 512	25B		EXT REFS	NOT INNER
1016	38	II	521 526	13B		EXT REFS	
1033	16	II	529 534	13B		EXT REFS	
1055	53	M	546 549	10B		EXT REFS	
1066	56	M	554 557	10B		EXT REFS	
1163	60	I	645 801	253B		EXT REFS	NOT INNER
1176	61	M	667 670	15B		EXT REFS	
1217	71	II	678 733	113B		EXT REFS	NOT INNER
1262	73	IJ	711 724	36B		EXT REFS	
1335	63	II	751 754	15B		EXT REFS	
1354	64	K	762 798	57B		EXT REFS	NOT INNER
1355	65	J	763 797	54B		EXT REFS	
COMMON BLOCKS	LENGTH		MEMBERS - BIAS NAME(LENGTH)				
COMRWP	3		O ITAPER (1)				1 ITAPEW (1)
STARE			ITAPER (1)				2 ITAPEP (1)

SUBROUTINE		VIBRAP	74/74	OPT=1	FTN 4.8+577		85/01/23 . 08 . 10 . 44		PAGE	23
EXTERNALS					REFRENCES					
MMULT			9		253	256	266			
NUMBER			6		373					
PLB			3		149	277	352	824		
PLOT			3		370	709	717	721	725	819
PLOTS			3							
PROGNA			2		161					
SIN	REAL		1	LIBRARY	136	234	235	240	242	768
SQRT	REAL		1	LIBRARY		327	700			
TIMEB			2		829					
TITLES			1		139	284	308	345	396	823
INLINE FUNCTIONS					DEF LINE	DEF LINE	DEF LINE	REFERENCES		
ABS	REAL		1	INTRIN	606	664	664			
IABS	INTEGER		1	INTRIN	366					
STATEMENT LABELS				DEF LINE	REFERENCES					
0	1			144	141					
0	10			262	260					
740	11			486	460					
754	12			495	485					
0	13			491	486					
1032	14			529	516					
1050	15			537	528					
0	16			534	529					
367	17			321	318					
0	18			417	414					
0	20			291	282					
0	21			813	364					
503	22			371	369					
0	23	INACTIVE		224	285					
303	25			288	384					
535	27			389	385					
0	28			387	385					
344	29			312	309					
407	30			329	305					
711	31			456	426					
0	32			483	477					
662	33			443	431					
672	34			447	432					
702	35			451	433					
0	38			526	521					
510	39			375	382					
0	41			512	501					
524	44			383	380					
0	48			368	367					
0	53			549	546					
0	56			557	554					
0	60			801	645					
0	61			670	667					
1120	62			585	421					
0	63			754	751					
0	64			798	762					
0	65			797	763					
1402	66			773	764					
1404	67			785	772					
1162	68			614	590					
1227	71			777	778					



SUBROUTINE VIBRAP		74 / 74	OPT = 1	RELOCATION	FTN 4.8+577	85/01/23 . 08 . 10 . 44	PAGE 21
VARIABLES	SN	TYPE					
2654	NEXT	INTEGER					
2662	NF	INTEGER					
2646	NMODES	*	INTEGER	CONSTS	REFS	367	DEFINED
0	NO	INTEGER		CLIST	REFS	393	395
6	NPAGEA	INTEGER		CTABLE	REFS	394	395
1	NPASS	INTEGER		CTABLE	REFS	394	395
2650	NPLOTS	INTEGER		CTABLE	REFS	56	146
0	NPLOTV	INTEGER		CTABLE	REFS	57	147
2632	NPTBM	INTEGER		CTABLE	REFS	59	
2711	NPTBMI	INTEGER		F . P .	DEFINED	351	2*354
2707	NPTS	INTEGER			REFS	307	313
17130	NPTSBM	INTEGER	ARRAY		REFS	426	467
2724	NPTSM1	INTEGER			REFS	520	524
2	NROWS	INTEGER			REFS	678	DEFINED
2663	NS	INTEGER			REFS	662	677
2667	NSUM	INTEGER			REFS	662	664
2625	NUM	INTEGER			REFS	761	DEFINED
2672	N1	INTEGER			REFS	36	540
2675	N2	INTEGER			REFS	437	439
17646	P1	REAL	ARRAY		REFS	437	439
17657	PITR	REAL	ARRAY		REFS	448	449
17206	PROD	REAL	ARRAY		REFS	448	449
2626	RATIO	REAL	ARRAY		REFS	475	477
17200	RORMV	REAL	ARRAY		REFS	475	477
2665	RRAT	REAL	ARRAY		REFS	524	532
17214	SCRATCH	REAL	ARRAY		REFS	520	521
17217	SCRCT2	REAL	ARRAY		REFS	45	178
2706	SHIFT	REAL			REFS	45	178
2701	SMLSTY	REAL			REFS	45	179
2702	SMLSTZ	REAL			REFS	37	181
2614	THET1D	REAL			REFS	522	606
2620	THET1R	REAL			REFS	328	346
2615	THET2D	REAL			REFS	37	182
2621	THET2R	REAL			REFS	415	DEFINED
2616	THET3D	REAL			REFS	38	183
2622	THET3R	REAL			REFS	489	504
2727	TITLE	REAL	ARRAY		REFS	523	524
4671	U	REAL	ARRAY		REFS	662	605
2720	ULL	REAL	ARRAY		REFS	601	602
2777	UU	REAL	ARRAY		REFS	602	606
2722	UUL	REAL	ARRAY		REFS	602	602
17221	U1	REAL	ARRAY		REFS	602	602

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SUBROUTINE FERGCV

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LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
20	10	I	33 36	24B	INSTACK EXT REFS NOT INNER
27	11	J	34 35	3B	INSTACK NOT INNER
45	12	J	37 39	16B	INSTACK NOT INNER
53	12	I	38 39	5B	INSTACK
74	15	I	41 42	4B	INSTACK
120	14	I	44 45	4B	INSTACK
126	15	I	46 49	22B	EXT REFS NOT INNER
142	15	J	48 49	3B	INSTACK
155	16	J	51 58	55B	NOT INNER
156	17	I	52 56	45B	NOT INNER
203	17	K	55 56	14B	OPT

## STATISTICS

PROGRAM LENGTH

52000B CM USED

554B

364

OPT = 1

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三

C C45700, SUB. AFAM (AUTOMATED FLUTTER ANALYSIS MODULE)

C A VALUE OF ONE (CORRESPONDING TO THE ORIGINAL ZERO VALUE) \* AFAM  
 C INDICATES THAT THE OPTION IS TO BE DELETED WHEREAS A VALUE OF TWO \* AFAM  
 C (CORRESPONDING TO THE ORIGINAL I'TH VALUE) INDICATES THAT THE \* AFAM  
 C OPTION IS TO BE EXERCISED \* AFAM  
 C FINALLY, FOR PROGRAMMING CONVENIENCE, A NEW SET OF OPTIONS \* AFAM  
 C REFERRED TO AS PROGRAM CONTROL WORD OPTIONS (XXXXX) ARE DEFINED \* AFAM  
 C TO BE EQUIVALENT TO THE CARD INPUT CONTROL WORD OPTIONS. \* AFAM  
 C  
 65 C KLUEF(1) = 0, IS CHANGED TO 1, AND CORRESPONDS TO KXXXXX = 1 \* AFAM  
 C KLUEF(1) = 1, IS CHANGED TO 2, AND CORRESPONDS TO KXXXXX = 2 \* AFAM  
 C  
 C THE SPECIFIC RELATIONSHIP OF THE CARD INPUT DATA AND PROGRAM \* AFAM  
 C CONTROL WORD OPTIONS IS GIVEN BELOW. \* AFAM  
 C  
 C KLUEF( 1 ) = KDUMMY \* AFAM  
 C  
 C ... KLUEF(1) .... INTERMEDIATE, (I = LKLUEF+1,...,2\*LKLUEF) \* AFAM  
 C PROGRAM CONTROL WORD OPTION FOR INDICATING WHICH OF THE OPTIONS \* AFAM  
 C IN FLUTTER ANALYSIS HAVE BEEN PERFORMED. \* AFAM  
 C  
 C VALUES DEFINED WITHIN THE PROGRAM HAVE THE FOLLOWING GENERAL \* AFAM  
 C FUNCTION ...  
 80 C KLUEF(1) = 0, THE I'TH FLUTTER ANALYSIS OPTION HAS NOT \* AFAM  
 C BEEN PERFORMED IN THE CURRENT RUN. \* AFAM  
 C = 1, THE I'TH FLUTTER ANALYSIS OPTION HAS BEEN \* AFAM  
 C PERFORMED IN THE CURRENT RUN. \* AFAM  
 C  
 C WHERE THE SPECIFIC FUNCTION OF EACH VARIABLE IS ASSOCIATED WITH \* AFAM  
 C THE SPECIFIC FUNCTION OF THE VARIABLE KLUEF(I) FOR \* AFAM  
 C I = 1,...,LKLUEF. \* AFAM  
 C LC(1) = -1 P/K FLUTTER \* AFAM  
 C = 0 PRESSURES ONLY \* AFAM  
 C = 1 K FLUTTER \* AFAM  
 C = 2 DIVERGENCE \* AFAM  
 C  
 90 C LC(2) = NO. OF MODES \* AFAM  
 C LC(3) = NO. OF SURFACES \* AFAM  
 C LC(4) = NO. OF REDUCED VELOCITIES (.GE.1) \* AFAM  
 C  
 C LC(5) = NO. OF DENSITIES (.GE.1) \* AFAM  
 C LC(6) = CLUE WORD FOR DISPLAY OF GEN. AIR FORCES AS COMPUTED AFAM  
 C LC(7) = CLUE WORD FOR LISTING PRESSURES AFAM  
 C LC(8) = CLUE WORD FOR LIFT COEFFICIENTS AFAM  
 C LC(9) = CLUE WORD FOR ADDITIONS TO FLUTTER DETERMINANT AFAM  
 C LC(10) = CLUE WORD FOR LISTING GEN. AIR FORCES IN QINTP AFAM  
 C LC(11) = REF. INDEX \*\*\*\*\* K FLUTTER AFAM  
 C LC(12) = O A INVERSE = 1 B INVERSE \*\*\*\*\* K FLUTTER AFAM  
 C LC(13) = CLUE WORD FOR GEN. AIR FORCE INTERPOLATION AFAM  
 C LC(14) = CLUE WORD FOR CALCOMP (FLUTTER) AFAM  
 C LC(15) = O EQUIV. VELOCITY = 1 TRUE VELOCITY (FLUTTER) AFAM  
 C LC(16) = CLUE WORD FOR STRUCTURAL DAMPING INPUT (FLUTTER) AFAM  
 C  
 95 C 1 SAME FOR ALL MODES = -1 AS SPECIFIED AFAM  
 C LC(17) = CLUE WORD FOR DISPLAY OF NO. OF ITERATIONS (P/K) AFAM  
 C LC(18) = CLUE WORD FOR ROOT INTERPOLATION \*\*\*\*\* P/K AFAM  
 C LC(19) = C:UE WORD FOR POST SOLUTION INTERPOLATION \*\*\*\*\* P/K AFAM  
 C LC(20) = CLUE WORD FOR DISPLAY OF ITERATIONS IN FLUTTER AFAM  
 C  
 C SOLUTION ROUTINES AFAM  
 C LC(21) = 1 RODDEN VORTEX LATTICE PROGRAM AFAM  
 C = 2 SUPERSONIC MACH BOX PROGRAM AFAM  
 C = 3 SUPERSONIC CHIRPATTIN' PROGRAM AFAM  
 C

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115 C LC(22) = CLUE WORD FOR AIC TAPE O COMPUTE -1 FOR MACH BOX AIC AFAM 116  
C = 1 EXISTS ON TAPE AFAM 117  
C LC(23) = CLUE WORD FOR DISPLAY OF MODAL INPUT DATA AFAM 118  
C LC(24) = CLUE WORD FOR DISPLAY OF MODAL INTERPOLATION OUTPUT AFAM 119  
C LC(25) = NO. OF MODE ELIMINATION CYCLES AFAM 120  
C LC(26) = NO. OF STIFFNESS VARIATION CYCLES AFAM 121  
C LC(27) = INDEX OF MODE FOR STIFFNESS VARIATION AFAM 122  
C LC(28) = CLUE WORD FOR VECTORS AFAM 123  
C LC(29) = LIST PHYSICAL VECTORS FOR K ANALYSIS AFAM 124  
C LC(30) = CLUE WORD FOR LISTING FLUTTER DETERMINANT AFAM 125  
C LC(31) = CLUE WORD FOR GEN. MASS ADDITIONS AND FREQ. CHANGE AFAM 126  
C LC(32) = CLUE WORD FOR ADDITIONS TO SPRING TERMS AFAM 127  
C LC(33) = CLUE WORD FOR STEADY STATE SOLUTION AFAM 128  
C LC(34) = CLUE WORD FOR CHANGES TO GEN. AIR FORCES AFAM 129  
C LC(35) = CLUE WORD FOR DISPLAY OF DIAPHRAGM DOWNWASH VALUES AFAM 130  
C SUPERSONIC PROGRAM FOR LC(22) = 0 OR -1 AFAM 131  
C LC(36) = CLUE WORD FOR FLUTTER OPTIMIZATION DATA AFAM 132  
C LC(37) = CLUE WORD FOR DISPLAY OF GEOMETRY DATA AFAM 133  
C IN DOUBLE LATTICE PROGRAM AFAM 134  
135 C LC(38) = CLUE WORD FOR AUTOMATIC EXCLUSION OF VIBRATION AFAM 135  
C MODES BASED ON RATIO OF GEN. AIR FORCES TO GEN. AFAM 136  
C MASSES AFAM 137  
C AFAM 138  
C AFAM 139  
C AFAM 140  
C \*\*\* ERROR MESSAGES \*\*\*\* \* AFAM 140  
C ----- \* AFAM 141  
C NONE \* AFAM 142  
C \*\*\*\*\* \* AFAM 143  
C \*\*\*\*\* \* AFAM 144  
C \*\*\*\*\* \* AFAM 145  
140 C SUBROUTINE AFAM (KPLOTF)  
C INTEGER YES AFAM 146  
C COMPLEX B, DETAD AFAM 147  
145 C AFAM 148  
AFAM 149  
AFAM 150  
AFAM 151  
AFAM 152  
AFAM 153  
AFAM 154  
AFAM 155  
AFAM 156  
AFAM 157  
AFAM 158  
AFAM 159  
AFAM 160  
AFAM 161  
AFAM 162  
AFAM 163  
AFAM 164  
AFAM 165  
AFAM 166  
AFAM 167  
AFAM 168  
AFAM 169  
AFAM 170  
AFAM 171  
160 C COMMON /CFMTA / FMTA  
COMMON /CLUEM / LKLU , KLUE  
COMMON /CLUEF / LKLUF , KLUEF  
COMMON /CTAPES/ ITAPES  
COMMON /COMRWP/ ITAPER, ITAPEW, ITAPEP  
COMMON /CTABLE/ KTABLE, NPASS , NROWS , NCOLS , NCOLST, KTABLO , NPAGEA  
1 COMMON /CTSHF / LTSHF , TSHF  
COMMON /CTSH / KTSF , LTSH , TSH  
165 C  
170 C

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4 PAGE
SUBROUTINE AFAM    74/74   OPT=1   FTN 4.8+577   85/01/23. 08. 10. 44
COMMON /COMA/  LC , BR , DETAD ,WW , .OMGR , 'NC
COMMON /MODD/  B , .VBO , .RVBO , 'NRVBO
COMMON /FLUTAN/ FMACH , .BETA , .NV
COMMON /FLUTB/  V , .RHOR , .NOTI , .NINZ , .RATOM
COMMON /FLUTC/  VA , .VB , .FLO , .FHI , .IE , .NQZ , .NVTOT
COMMON /FLUTO/  QMWT , .GMIN , .FRMAX , .FRMIN , 'VMAX , 'VMIN
COMMON /PRPL/  GMAX , .TITLE2 , DUB , .FUB , .VUB , .DLB , 'FLB
COMMON /CALCP/  CALCP , .IPLOT , .LSD , .DSCALE , .FSCALE , .VSCALE , .DPLEN
1          2          'FRIEN , 'VLEN , 'XDT
COMMON /KLUES/  KLUSE , KLUNAL , IRED , KLUMB , MSADD , NPAS , IDNOPT ,
VDES , EPS1 , DMMAX , NBAR , NFIX , D , DEL , EPS2 , NCYC , NNN , IBAND ,
2          IFIN , KLUQ , MORMBAL , DBAL
C
C INITIAL CONDITIONS
C ... PSN(100) TO PSN(150) ....
100      LTSHR = LTSH
        IF (LTSH .EQ. YES) LTSHR = LTSH-2
        DATA FAO0 /4HF00/
        NCC = 10
        NKLUF=LKLUF
        ITAPESS(24) = ISAVFO
C
C PRINT TITLE FOR AUTOMATED FLUTTER ANALYSIS MODULE
C CALL TAFAM
C
C READ INPUT DATA
C ... PSN(190) TO PSN(290) ....
190      190 REWIND ITAPER
        READ (ITAPER,5060) FAOOD
        IF (FAOOD .NE. FAOOR) GO TO 195
        READ (ITAPER,FMAT) (TSHF(L), L=1,LTSHR)
        CALL CLUES (ITAPER,NCC,NKLUF,KLUFF)
        KDUMMY = KLUFF(1)
        READ (ITAPER,50) LC
        DO 210 L=1,LTSH
        210 TSH(L) = TSHF(L)
C
C READ FREQUENCIES, GENERALIZED MASSES, AND MODES FROM CARDS AND OR
C TAPE. CHOOSE APPROPRIATE MODES FOR INTERPOLATIONS
C
C CALL POOL
        CALL PROGNA (4H(POO, 4HL ))
        CALL TIMEB (23,23FROM AFAM, AFTER POOL )
C
C 70 IFTP = LC(21)
        KPLOTF = LC(1:4) + 1
C
        GO TO (500, 600, 700). IFTP
C
225      225 AFAM
226      226 AFAM
227      227 AFAM
228      228 AFAM
229      229 AFAM

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SUBROUTINE AFAM	74/74	OPT=1	FTN 4 . B+577	85/01/23 . 08.10.44	PAGE
C	C	C	C	C	5
230	C SUBSONIC AERODYNAMICS USING DOUBLET LATTICE PROCEDURE				
	C				
	500 CONTINUE				
	CALL RODDEN				
	CALL PROGNA (4H(ROD, 4HDEN))				
	CALL TIMEB (23.23HFROM AFAM, AFTER RODDEN)				
	GO TO 800				
	C				
	C SUPERSONIC AERODYNAMICS USING MACH BOX PROCEDURE				
	C				
	600 CONTINUE				
	CALL MACH				
	CALL PROGNA (4H(MAC, 4HK))				
	CALL TIMEB (23.23HFROM AFAM, AFTER MACH )				
	GO TO 800				
	C				
	C SUBSONIC AERODYNAMICS USING COLLOCATION PROCEDURE				
	C				
	700 CONTINUE				
	CALL KERN				
	CALL PROGNA (4H(KER, 4HN))				
	CALL TIMEB (23.23HFROM AFAM, AFTER KERN )				
	800 CONTINUE				
	C				
	C FLUTTER SOLUTION				
	C				
	IF (LC(1) .EQ. 0) GO TO 990				
	CALL SOLFLT (ISAVFO)				
	990 CONTINUE				
	CALL PROGNA (4H(AFA, 4HM))				
	CALL TIMEB (35. 35HFROM AFAM - END OF FLUTTER ANALYSIS)				
	C				
	C				
	C FORMATS				
	C				
	50 FORMAT (10I5)				
	5060 FORMAT (18A4)				
	C				
	RETURN				
	END				
	265				
	C				
	266				
	C				
	267				
	C				
	268				
	C				
	269				
	C				
	270				
	AFA				
	271				
	AFA				
	272				
	AFA				
	273				
	AFA				
	274				

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM  
 227 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SUBROUTINE AFAM

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## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES  
3 AFAM 146 272

VARIABLES	SN	TYPE	COMPLEX	ARRAY	RELOCATION	MODD	FLUTAN	COWA	KLUES	REFS	149	155	173
0 B	1	BETA	REAL							REFS	174		
50 BR	5	REAL	REAL							REFS	172		
15 D	15	REAL	REAL							REFS	183		
27 DBAL	27	DBAL	REAL							REFS	183		
16 DEL	16	DEL	REAL							REFS	183		
6200 DETAD	6200	DETAD	COMPLEX	ARRAY						REFS	149	155	173
47 DLB	47	DLB	REAL							REFS	180		
57 DPLEN	57	DPLEN	REAL							REFS	180		
54 DSCALE	54	DSCALE	REAL							REFS	180		
44 DUB	44	DUB	REAL							REFS	180		
12 DWMAX	12	DWMAX	REAL							REFS	183		
11 EPS1	11	EPS1	REAL							REFS	183		
17 EPS2	17	EPS2	REAL							REFS	183		
215 FAOOD	215	FAOOD	REAL							REFS	208	208	207
162 FAOR	162	FAOR	REAL							REFS	208	208	207
3 FHI	3	FHI	REAL							REFS	177		
50 FLB	50	FLB	REAL							REFS	180		
2 FLO	2	FLO	REAL							REFS	177		
0 FMACH	0	FMACH	REAL							REFS	174		
0 FMTA	0	FMTA	REAL							REFS	151	162	209
60 FRLEN	60	FRLEN	REAL							REFS	180		
2 FRMAX	2	FRMAX	REAL							REFS	179		
3 FRMIN	3	FRMIN	REAL							REFS	179		
55 FSCALE	55	FSCALE	REAL							REFS	180		
45 FUB	45	FUB	REAL							REFS	180		
0 GMAX	0	GMAX	REAL							REFS	179		
1 GMIN	1	GMIN	REAL							REFS	179		
22 IBAND	22	IBAND	INTEGER							REFS	183		
7 IDNOPT	7	IDNOPT	INTEGER							REFS	123		
4 IE	4	IE	INTEGER							REFS	177		
23 IFIN	23	IFIN	INTEGER							REFS	183		
220 IFTP	220	IFTPL	INTEGER							REFS	227	DEFINED	224
52 IPLOT	52	IPLOT	INTEGER							REFS	180		
2 IRED	2	IRED	INTEGER							REFS	183		
214 ISAVFO	214	ISAVFO	INTEGER							REFS	260	DEFINED	196
2 ITAPEP	2	ITAPEP	INTEGER							REFS	166		
0 ITAPER	0	ITAPER	INTEGER							REFS	166		
7 ITAPES	7	ITAPES	INTEGER							REFS	152		
1 ITAPEW	1	ITAPEW	INTEGER							REFS	167		
217 KDUMMY	217	KDUMMY	*	INTEGER						REFS	166		
24 KLUB	24	KLUB	INTEGER							REFS	183		
4 KLUBAL	4	KLUBAL	INTEGER							REFS	183		
1 KLUE	1	KLUE	INTEGER							REFS	152	163	211
1 KLUEF	1	KLUEF	INTEGER							REFS	152	164	210
3 KLUMD	3	KLUMD	INTEGER							REFS	183		
1 KUNAL	1	KUNAL	INTEGER							REFS	183		
25 KLUQ	25	KLUQ	INTEGER							REFS	183		
0 KLUSE	0	KLUSE	INTEGER							REFS	183		

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209

196

207

206

196

VARIABLES	SN	TYPE	RELOCATION	F.P.	DEFINED	REFS
0 KPLOT		INTEGER	CTABLE		146	225
0 KTABLE		INTEGER	CTABLE		167	
5 KTABLO		INTEGER	CTSH		167	
0 KTSW		INTEGER	CTSH		170	
216 L		INTEGER	CTSH		209	
0 LC		INTEGER	COMA	REFS	209	213
		ARRAY	REFS	154	225	259
0 LKLU		INTEGER	CLUEM	REFS	212	
0 LKLUF		INTEGER	CLUEF	REFS	163	
53 LSD		INTEGER	CALCP	REFS	164	195
1 LTSW		INTEGER	CTSH	REFS	180	
0 LTSWF		INTEGER	CTSHF	REFS	170	191
211 LTSHR		INTEGER	KLUES	REFS	169	
26 MORBAL		INTEGER	KLUES	REFS	209	
5 MSADD		INTEGER	KLUES	REFS	183	
13 NBAR		INTEGER	KLUES	REFS	183	
17550 NC		INTEGER	KLUES	REFS	183	
212 NCC		INTEGER	KLUES	REFS	173	
3 NCOLS		INTEGER	KLUES	REFS	210	194
4 NCOLST		INTEGER	KLUES	REFS	167	
20 NCYC		INTEGER	KLUES	REFS	167	
14 NFIX		INTEGER	KLUES	REFS	183	
43 NINZ		INTEGER	KLUES	REFS	156	
213 NKLUF		INTEGER	KLUES	REFS	210	195
21 NNN		INTEGER	KLUES	REFS	183	
0 NO		INTEGER	CONSTS	REFS	171	
12 NOTI		INTEGER	FLUTC	REFS	156	176
6 NPAGEA		INTEGER	CTABLE	REFS	167	
6 NPAS		INTEGER	KLUES	REFS	183	
1 NPASS		INTEGER	CTABLE	REFS	167	
5 NQZ		INTEGER	FLUTV	REFS	177	
2 NROWS		INTEGER	CTABLE	REFS	167	
57 NRVBO		INTEGER	FLUTAN	REFS	174	
31 NV		INTEGER	FLUTB	REFS	175	
6 NVTOT		INTEGER	FLUTV	REFS	177	
17500 OMGR		REAL	MODD	REFS	155	173
0 QMWT		REAL	FLUTQ	REFS	157	178
310 QWT		REAL	FLUTQ	REFS	157	178
2013 RATOM		REAL	FLUT	REFS	158	176
0 RHOR		REAL	FLUT	REFS	158	176
40 RVBO		REAL	FLUT	REFS	158	174
0 TITLE1		REAL	ARRAY	CALCP	REFS	159
22 TITLE2		REAL	ARRAY	CALCP	REFS	159
2 TSH		REAL	ARRAY	CTSH	REFS	153
1 TSHF		REAL	ARRAY	CTSHF	REFS	153
0 V		REAL	ARRAY	FLUTB	REFS	160
0 VA		REAL	FLUTV	REFS	177	
1 VB		REAL	FLUTV	REFS	177	
2 VBO		REAL	ARRAY	FLUTAN	REFS	160
10 VDES		REAL	KLUES	REFS	183	
51 VLB		REAL	CALCP	REFS	180	
61 VLEN		REAL	CALCP	REFS	180	
4 VMAX		REAL	PRPL	REFS	179	
5 VMIN		REAL	PRPL	REFS	179	
56 VSCALE		REAL	CALCP	REFS	180	
46 VUB		REAL	CALCP	REFS	180	
14400 WW		RFAI	ARRAY	MINN	REFS	155

SUBROUTINE AFAM		74/74		OPT=1		FTN 4.8+577		85/01/23. 08.10.44		PAGE 8	
VARIABLES	SN	TYPE	RELOCATION		REFS	180	171	192			
62 XDT	REAL	INTEGER	CALCP	CONSTS	REFS	148					
1 YES	VARIABLES USED AS FILE NAMES, SEE ABOVE										
EXTERNALS	TYPE	ARGS	REFERENCES								
CLUES		4	210								
KERN		0	251								
MACH		0	242								
POOL		0	220								
PROGNA		2	221								
RODDEN		0	233								
SOLFLT		1	260								
TAFAM		0	201								
TIMEB		2	222								
STATEMENT LABELS	DEF	LINE	REFERENCES								
203 50 FMT		269	212								
0 70		224									
0 100		190									
0 190		INACTIVE									
20 195		206	208								
0 210		214	213								
64 500		232	227								
72 600		241	227								
100 700		250	227								
105 800		254	236								
110 990		261	259								
205 5060 FMT		270	207								
LOOPS	LABEL	INDEX	FROM	TO	LENGTH	PROPERTIES					
41 210 L		213	214	3B	INSTACK						
COMMON BLOCKS	LENGTH		MEMBERS - BIAS NAME(LENGTH)								
CFMFTA	1		O FMFTA	(1)							
CLUEM	81		O LKLU	(1)							
CLUEF	21		O LKLUF	(1)							
CTAPES	50		O ITAPES	(50)							
COMRWP	3		O ITAPER	(1)							
CTABLE	8		O KTABLE	(1)							
			3 NCOLS	(1)							
			6 NPAGEA	(1)							
			O LTSFH	(1)							
CTSHF	2		O KTSFH	(1)							
CTSH	3		O ND	(1)							
CONSTS	2		O NO	(1)							
COMA	41		O LC	(40)							
MODD	8041		O B	(3200)							
			8000 OMGR	(40)							
FLUTAN	48		O FMACH	(1)							
FLUTB	26		32 RVBO	(15)							
FLUTC	1055		O V	(25)							
			O RHOR	(10)							
			1035 RATOM	(20)							
FLUTV	7		O VA	(1)							
			3 FHI	(1)							
			6 NVTOT	(1)							
FLUTQ	205		O QMWT	(200)							
PRPL	6		O GMAX	(1)							

1 KLUE	(80)
1 KLUEF	(20)
1 ITAPEW	(1)
1 NPASS	(1)
4 NCOLST	(1)
7 ITAPET	(1)
1 TSHF	(1)
1 LTSFH	(1)
1 YES	(1)
40 BR	3200 DETAD (3200)
8040 NC	(1)
1 BETA	(1)
47 NRVO	(1)
25 NV	(1)
10 NOTI	(25)
6400 WW	(1600)
2 TSH	(1)
2 VBO	(30)
35 NINZ	(1000)
2 FLO	(1)
5 NQZ	(1)
2 FRMAX	(1)

SUBROUTINE AFAM		74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE 9	
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
CALCP	51	3 FRMIN 0 TITLE1 37 FUB 40 FLB 43 LSD 46 VSCALE 49 VLEN 0 KLUSE 3 KLUMD 6 NPAS 9 EPS1 12 NFIX 15 EPS2 18 IBAND 21 KLUQ	(1) (18) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	4 VMAX 18 TITLE2 38 VUB 41 VLB 44 DSCALE 47 DPLEN 50 XDT 1 KLUNAL 4 KLUBAL 7 IDNOPT 10 DWMAX 13 D 16 NCYC 19 IFIN 22 MORBAL	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	5 VMIN 36 DBB 39 DLB 42 IPLOT 45 FSCALE 48 FRLEN	(1) (1) (1) (1) (1) (1)
KLUQS	24				2 IRED 5 MSADD 8 VDES 11 NBAR 14 DEL 17 NNN 20 KLUB 23 DBAL	(1) (1) (1) (1) (1) (1) (1)	
STATISTICS	PROGRAM LENGTH CM LABELED COMMON LENGTH 520008 CM USED	272B 22713B	186 9675				

STATISTICS  
PROGRAM LEN  
CM LABELED  
520

SUBROUTINE TAFAM      74/74      OPT = 1

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SUBROUTINE TAFAM 74/74 OPT=1

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SUBROUTINE TAFAM      74/74      OPT=1

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```

173   A, 13H      AAAAAA
      * , 40X, 1H*
      * , / , 5X, 1H*, 41X
      F, 13H  FFF
174   TAFAM
175   TAFAM
176   TAFAM
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675 BUFFER(I) = QZ(J,I)
685 CALL RNRW (MTAP49,BUFFER,LC2)
REWIND MTAP49
      C STORE PERTINENT INFORMATION FOR USE IN INDIVIDUAL
      C AERODYNAMIC THEORIES
      C
      C CALL FLINFO
180   C
      C FORMATS
      C
      C 20 FORMAT(10I5)
      C 40 FORMAT (7E10.3)
      C 71C FORMAT(3(2I5,E10.3))
1000 FORMAT (10X, 42HVIBRATION DATA HAS BEEN ENTERED FROM CARDS)
1100 FORMAT (10X, 56HVIBRATION DATA HAS BEEN ENTERED FROM THREE FILES O
      C 1N TAPE)
1200 FORMAT (10X, 53HVIBRATION DATA HAS BEEN ENTERED FROM ONE FILE ON T
      C 1APE)
2000 FORMAT (10X,41HENTER VIBRATION DATA FOR FLUTTER ANALYSIS
      C ,/10X,41(1H-))
      C
      C RETURN
      C END
195

```

## CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

53 1 AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
1 POOL	1	195				
VARIABLES	SN TYPE	RELATION				
O B	COMPLEX	ARRAY MODD	10	12		
50 BR	REAL	COMA	REFS 13			
755 BUFFER	REAL	ARRAY	REFS 5	38	92	100
			115 135	145	173	131
242 CSCL	REAL	FLUT	REFS 24			
6200 DETAD	COMPLEX	MODD	REFS 10	12		
22165 DUMMY	REAL		REFS 6	86	97	110
726 I	INTEGER	ARRAY	REFS 63	71	91	92
			126 131	134	135	144
			2*172 DEFINED	62	65	71
			126 131	133	143	151
743 IDMAS	INTEGER		REFS 97			
742 IDMODE	INTEGER		REFS 86			
744 IDMOMG	INTEGER		REFS 110			

```

115      OMG(I12) = BUFFER(J)
           I2 = I2 + 1
   680  CONTINUE
           CALL PLB (1,1,ITAPEW)
           WRITE (ITAPEW,1100)
   120      C
           C READ VIBRATION DATA FROM TAPE USING ONE FILE ONLY
           C
   125      500 CONTINUE
           READ (ITAPER,20) (IFLMD(I), I=1,LC2)
           CALL FSIO (6HIDVIBA, IDVIBA, JDVIBA, LOCDFIL,2)
           REWIND IDVIBA
           MTAP4 = IDVIBA
           READ(MTAP4) NC,NM
           READ (MTAP4) (BUFFER(I), I=1,NM)
           I1 = 1
           DO 3 I=1,NM
           IF ( J .NE. IFLMD(I1) ) GO TO 3
   130      OMG(I1) = BUFFER(I)
           I1 = I1 + 1
   135      3 CONTINUE
           I2 = 1
           DO 5 J=1,NM
           READ (MTAP4) (BUFFER(IJ) , IJ=1,NM)
           IF ( J .NE. IFLMD(I2) ) GO TO 5
           I1 = 1
           DO 6 I=1,NM
           IF ( I .NE. IFLMD(I1) ) GO TO 6
           WW (I2,I1) = BUFFER(I)
           I1 = I1 + 1
   140      6 CONTINUE
           I2 = I2 + 1
   145      5 CONTINUE
           I1 = 1
           DO 7 I=1,NM
           CALL RNRW (-MTAP4,QZ(1,11),NC)
           IF ( I .EQ. IFLMD(I1) ) I1 = I1+1
   150      7 CONTINUE
           CALL FCLOSE (IDVIBA,JDVIBA,2)
           CALL PLB (1,1,ITAPEW)
           WRITE (ITAPEW,1200)
           C
           C STORE SELECTED MODE SHAPES ON TAPE FOR USE IN VARIOUS AERODYNAMIC
           C THEORIES AND FLUTTER.
           C INFORMATION IS STORED IN THE FOLLOWING ORDER.
           C 1. ALL COORDINATES ARE STORED ON TAPE FOR EACH MODE.
           C 2. ALL MODES ARE STORED ON TAPE FOR EACH COORDINATE.
   160      600 CONTINUE
           REWIND MTAP49
           DO 655 I=1,LC2
   165      655 CALL RNRW (MTAP49,QZ(1,1),NC)
           DO 685 J=1,NC
   170      685 I=1,LC2

```

```

C READ VIBRATION DATA FROM CARDS
C
60      300 READ (ITAPER,20) NC
          DO 60 I=1,LC2
            READ (ITAPER,40) (QZ(K,I), K=1,NC)
            READ (ITAPER,20) NCARD
            DO 25 I=1,NCARD
              READ (ITAPER,710) I1,J1,VALU1,I2,J2,VALU2,I3,J3,VALU3
              IF (I1.NE.0 .AND. J1.NE.0) WW(I1,J1) = VALU1
              IF (I2.NE.0 .AND. J2.NE.0) WW(I2,J2) = VALU2
              IF (I3.NE.0 .AND. J3.NE.0) WW(I3,J3) = VALU3
25      CONTINUE
          READ (ITAPER,40) (OMG(I), I=1,LCC2)
          CALL PLB (1,1,ITAPEW)
          WRITE (ITAPEW,1000)
          GO TO 600
65      C
C READ VIBRATION DATA FROM TAPE USING THREE FILES
C
80      610 CONTINUE
C      BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      CALL DINIT (12,8HFT12FOO1)
C      MTAP4 = ITAPES(12)
C      ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C      READ (ITAPER,20) IDMODE, IDMAS, IDOMG
C      READ (ITAPER,20) (IFLMD(I), I=1,LC2)
C      CALL GEDLAB (6HPOOL ,MTAP4,DUMMY,IRDMODE,IRROW,NM)
85      DO 630 J = 1,IRROW
          CALL GETROW (MTAP4,1,BUFFER,NM)
          I1 = 1
          DO 9  I = 1,NM
            IF ( I .NE. IFLMD(I1) ) GO TO 9
            QZ(J,I1) = BUFFER(I)
            I1 = I1 + 1
9      CONTINUE
630      CONTINUE
          NC = IRROW
          CALL GEDLAB (6HPOOL ,MTAP4,DUMMY,IRDMAS,IRDWM,NM)
          I2 = 1
          DO 690 J=1,IRROW
            CALL GETROW (MTAP4,1,BUFFER,NM)
            IF (J.NE.IFLMD(I2)) GOTO 690
            I1 = 1
            DO 660 I=1,NM
              IF (I1.NE.IFLMD(I1)) GOTO 660
              WW(I2,I1) = BUFFER(I)
              I1 = I1 + 1
660      CONTINUE
              I2 = I2 + 1
690      CONTINUE
              CALL GEDLAB (6HPOOL ,MTAP4,DUMMY,IRDOMG,IRDWM,NM)
              I2 = 1
              DO 680 J=1,IRROW
                CALL GETROW (MTAP4,1,BUFFER,NM)
100      CONTINUE
105      680 CONTINUE
110      690 CONTINUE
111      700 CONTINUE
112      710 CONTINUE
113      720 CONTINUE
114      730 CONTINUE
115      740 CONTINUE
      
```



FUNCTION COMSCA 74/74 OPT=1 FTN 4.8+577

EXTERNALS DCMPLF COMPLEX 2 REFERENCES 3 32

STATEMENT LABELS 0 310 36 320 DEF LINE REFERENCES 28 32 25 13

LOOPS LABEL INDEX 26 310 J FROM-TO LENGTH PROPERTIES 25 28 7B INSTACK

STATISTICS PROGRAM LENGTH 52000B CM USED 56B 46

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PAGE 2

FUNCTION COMSCA 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 1

```

1      CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
      COMPLEX FUNCTION COMSCA (W,Z,SS,NN,IW,IZ) COMSCA 2
      COMPLEX DCMLF COMSCA 3
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS COMSCA 4
      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS COMSCA 5
      COMPLEX FUNCTION COMSCA*16 (W,Z,SS,NN,IW,IZ) COMSCA 6
      DOUBLE PRECISION SS COMSCA 7
      COMPLEX*16 DCMLF COMSCA 8
      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS COMSCA 9
      C      DIMENSION W(2,IW,1), Z(2,IZ,1), SS(2) COMSCA 10
      IF ( NN.LE. 0 ) GO TO 320 COMSCA 11
      C      CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS COMSCA 12
      DO 310 J = 1,NN COMSCA 13
      SS(1) = SS(1) + DBLE(W(1,1,J))*DBLE(Z(1,1,J)) COMSCA 14
      C      1   - DBLE(W(1,1,J))*DBLE(Z(2,1,J)) COMSCA 15
      C 310 SS(2) = SS(2) + DBLE(W(1,1,J))*DBLE(Z(2,1,J)) COMSCA 16
      C      1   + DBLE(W(2,1,J))*DBLE(Z(1,1,J)) COMSCA 17
      CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS COMSCA 18
      C      CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS COMSCA 19
      DO 310 J=1,NN COMSCA 20
      SS(1) = SS(1) + W(1,1,J) * Z(1,1,J)
      1   - W(2,1,J) * Z(2,1,J)
      310 SS(2) = SS(2) + W(1,1,J) * Z(2,1,J)
      1   + W(2,1,J) * Z(1,1,J)
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS COMSCA 21
      C      320 COMSCA = DCMLF (SS(1),SS(2))
      RETURN COMSCA 22
      END COMSCA 23
      C      CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS COMSCA 24
      DO 310 J=1,NN COMSCA 25
      SS(1) = SS(1) + W(1,1,J) * Z(1,1,J)
      1   - W(2,1,J) * Z(2,1,J)
      310 SS(2) = SS(2) + W(1,1,J) * Z(2,1,J)
      1   + W(2,1,J) * Z(1,1,J)
      CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS COMSCA 26
      C      320 COMSCA = DCMLF (SS(1),SS(2))
      RETURN COMSCA 27
      END COMSCA 28
      C      SYMBOLIC REFERENCE MAP (R=3)
      ENTRY POINTS DEF LINE REFERENCES
      5 COMSCA 2 33
      VARIABLES SN TYPE RELOCATION DEFINED
      51 COMSCA COMPLEX F.P. REFS 32 DEFINED 2
      0 IW INTEGER F.P. REFS 12 DEFINED 2
      0 IZ INTEGER F.P. REFS 4*26 4*28 DEFINED 2
      53 J INTEGER F.P. REFS 13 25 DEFINED 2
      0 NN INTEGER F.P. REFS 12 26 28 2*32 DEFINED 2
      0 SS REAL ARRAY F.P. REFS 28 12 2*26 DEFINED 2
      0 W REAL ARRAY F.P. REFS 12 2*26 DEFINED 2
      0 Z REAL ARRAY F.P. REFS 12 2*26 DEFINED 2
  
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	RELOCATION
5 COMSCA	2	33	
VARIABLES			
51 COMSCA	SN	TYPE	
0 IW		COMPLEX	F.P.
0 IZ		INTEGER	F.P.
53 J		INTEGER	F.P.
0 NN		INTEGER	F.P.
0 SS		REAL	F.P.
		ARRAY	ARRAY
O W		REAL	ARRAY
O Z		REAL	ARRAY

ENTRY POINTS DEF LINE REFERENCES  
4 DSCAPR 24 49

VARIABLES	SN	TYPE	RELOCATION	DEFINED
31 DSCAPR		REAL	F.P.	47
0 IX		INTEGER	F.P.	45
0 IV		INTEGER	F.P.	46
34 J	*	INTEGER	DEFINED	24
32 JX		INTEGER	REFS	24
33 JY		INTEGER	REFS	24
0 N		INTEGER	REFS	45
0 S		REAL	REFS	38
0 X		REAL	REFS	46
0 Y		REAL	REFS	46

STATEMENT LABELS		DEF LINE	REFERENCES
0 100	INACTIVE	33	32
0 110		46	35
27 120		47	2*32

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
21 110	J	35 46	4B	INSTACK	

STATISTICS  
PROGRAM LENGTH  
52000B CM USED

40B

32

74/74 OPT=1

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```
1      C45700, FUN. DSCAPR          DSCAPR 2
C***** DSCAPR 3
C***** DSCAPR 4
C***** DSCAPR 5
C***** DSCAPR 6
C***** DSCAPR 7
C***** DSCAPR 8
C***** DSCAPR 9
C***** DSCAPR 10
C***** DSCAPR 11
C***** DSCAPR 12
C***** DSCAPR 13
C***** DSCAPR 14
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C***** DSCAPR 46
C***** DSCAPR 47
C***** DSCAPR 48
C***** DSCAPR 49
C***** DSCAPR 50
C***** DSCAPR 51

1      C*** FUNCTION DSCAPR ****
5      C*** OBJECTIVE ****
C*** INPUT/OUTPUT ****
C*** ACCUMULATES PRODUCTS OF ROW AND COLUMN ELEMENTS OF MATRICES.
10     C*** SUMMARY OF SYMBOLS ****
15     C*** ERROR MESSAGES ****
C*** NONE.
20     C*** ****
C
C FUNCTION DSCAPR(X,Y,S,N,IX,IY)
25     C DIMENSION X(1),Y(1)
C
C CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C DOUBLE PRECISION S,DSCAPR
C CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
30
C
C IF (N) 120,120,100
100    JX = 1
      JY = 1
      DO 110 J = 1,N
110
C
C CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C S = S + X(JX)*Y(JY)
CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
40
C
C CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C S = S + DBLE(X(JX)) * DBLE(Y(JY))
C CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
45     JX = JX + IX
      110 JY = JY + IY
      120 DSCAPR = S
C
C RETURN
END
50
```

SUBROUTINE CNRW 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 1

```
1      C      SUBROUTINE CNRW (IU, A, MID)
      C      COMPLEX   A(MID)
      C      IF (IU .LT. 0) GO TO 10
      C      WRITE (IU) A
      C      RETURN
10     IB = IABS (IU)
      C      READ (IB) A
      C      RETURN
      C      END
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES					
3 CNRW	1	7	10				
VARIABLES	SN TYPE	RELOCATION	REFS	3	6	DEFINED	1
0 A	COMPLEX	ARRAY F.P.	DEFINED	8	1/O REFS	9	9
34 IB	INTEGER	F.P.	REFS	5	8	DEFINED	1
0 IU	INTEGER	F.P.	REFS	3	DEFINED	1	1/O REFS
0 MID	INTEGER	F.P.					
VARIABLES USED AS FILE NAMES. SEE ABOVE							
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE REFERENCES	8			
TABS	INTEGER	1 INTRIN					
STATEMENT LABELS		DEF LINE REFERENCES					
15 10		8 5					
STATISTICS							
PROGRAM LENGTH							
52000B CM USED		358	29				

SUBROUTINE RNRW	74/74	OPT=1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	1
1 C SUBROUTINE RNRW (IU, A, MID)				RNRW	2		
C DIMENSION A(MID)				RNRW	3		
5 C IF (IU .LT. 0) GO TO 10				RNRW	4		
WRITE (IU) A				RNRW	5		
RETURN				RNRW	6		
10 IB = IABS(IU)				RNRW	7		
READ (IB) A				RNRW	8		
RETURN				RNRW	9		
10 END				RNRW	10		
				RNRW	11		
				RNRW	12		

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES					
3 RNRW	1	7	10				
VARIABLES	SN TYPE	RELOCATION					
0 A	REAL	ARRAY F.P.	REFS	3	6	DEFINED	1
34 IB	INTEGER		DEFINED	8	9		9
0 IU	INTEGER	F.P.	REFS	5	8	I/O REFS	1
0 MID	INTEGER	F.P.	REFS	3	5	DEFINED	1
	VARIABLES USED AS FILE NAMES. SEE ABOVE						
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES			
IABS	INTEGER	1 INTRIN	8				
STATEMENT LABELS		DEF LINE	REFERENCES				
15 10		8	5				
STATISTICS							
PROGRAM LENGTH		35B	29				
52000B CM USED							

SUBROUTINE TAFAM 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 8

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

6 NPAGE (1) 7 KBPAGE (1) 8 LINESG (1)

9 KOUNTI (1) 10 KOUNTI (1)

0 KTABLE (1) 1 NPASS (1) 2 NROWS (1)

3 NCOLS (1) 4 NCOL ST (1) 5 KTABLO (1)

6 NPAGEA (1) 7 ITAPEI (1)

0 AFFDL (4)

CTABLE 8

CAFFDL 4

STATISTICS

PROGRAM LENGTH	1104B	580
CM LABELED COMMON LENGTH	32B	26
52000B CM USED		

SUBROUTINE TAFAM 74/74 OPT=1  
ENTRY POINTS DEF LINE 15 REFERENCES

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VARIABLES	SN	TYPE	RELOCATION	REFS
0 AFFDL		REAL	ARRAY CAFDL	17 24 58
2 ITAPEP		INTEGER	COMRWP	19
0 ITAPER		INTEGER	COMRWP	19
7 ITAPET		INTEGER	CTABLE	22
1 ITAPEW		INTEGER	COMRWP	19
			REFS	57 58
			REFS	65 66
7 KBPAGE		INTEGER	CLIST	60 61
4 KLABEL		INTEGER	CLIST	62
0 KOUNT		INTEGER	CLIST	63
11 KOUNTH		INTEGER	CLIST	64
12 KOUNTI		INTEGER	CLIST	65
1 KPAGE		INTEGER	CLIST	66
0 KTABLE		INTEGER	CTABLE	67
5 KTABLO		INTEGER	CTABLE	68
5 KTPAGE		INTEGER	CLIST	69
2 LINES		INTEGER	CLIST	20
10 LINESG		INTEGER	CLIST	20
3 LINEST		INTEGER	CLIST	20
3 NCOLS		INTEGER	CTABLE	20
4 NCOLST		INTEGER	CTABLE	20
6 NPAGE		INTEGER	CLIST	20
6 NPAGEA		INTEGER	CTABLE	20
1 NPASS		INTEGER	CTABLE	20
2 NROWS		INTEGER	CTABLE	20
		VARIABLES USED AS FILE NAMES, SEE ABOVE		
EXTERNALS		TYPE	ARGS	REFERENCES
		PTABLE	3	34 38
		TITLES	1	30

STATEMENT LABELS DEF LINE REFERENCES  
201 100 FMT 70 54  
251 105 FMT 88 55  
317 110 FMT 104 56  
354 115 FMT 120 57  
411 120 FMT 136 58  
445 125 FMT 152 59  
475 130 FMT 168 60  
516 135 FMT 184 61  
537 140 FMT 200 62  
560 145 FMT 216 63  
601 150 FMT 235 64  
627 155 FMT 254 65  
666 160 FMT 273 66  
726 165 FMT 292 67  
766 170 FMT 311 68  
1032 175 FMT 331 69

COMMON BLOCKS LENGTH REFERENCES  
COMRWP 3  
CLIST 11

MEMBERS - BIAS NAME(LENGTH)  
1 ITAPEW (1)  
0 ITAPER (1)  
0 KOUNT (1)  
3 LINEST (1)

2 ITAPEP (1)  
2 LINES (1)  
5 KTPAGE (1)

1 ITAPEW (1)  
0 ITAPER (1)  
0 KOUNT (1)  
4 KLABEL (1)

SUBROUTINE TAFAM 74/74 OPT=1

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```
* /, 5X, 1H*, 2X          TAFAM 287
* ,5X, 15H, GRUMMAN     TAFAM 288
* ,4OH, GGGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H* )           TAFAM 289
* 165 FORMAT (           TAFAM 290
*   5X, 1H*, 2X          TAFAM 291
* ,5X, 15H, AEROSPACE  .4X
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 292
* ,5X, 15H, CORPORATION .4X
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 293
* ,5X, 15H, 40          TAFAM 294
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 295
* ,5X, 15H, 40          TAFAM 296
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 297
* ,5X, 15H, 40          TAFAM 298
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 299
* ,5X, 15H, 40          TAFAM 300
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 301
* ,5X, 15H, 40          TAFAM 302
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 303
* ,5X, 15H, 40          TAFAM 304
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 305
* ,5X, 15H, 40          TAFAM 306
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 307
* ,5X, 15H, 40          TAFAM 308
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 309
* ,5X, 15H, 40          TAFAM 310
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 311
* ,5X, 15H, 40          TAFAM 312
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 313
* ,5X, 15H, 40          TAFAM 314
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 315
* ,5X, 15H, 40          TAFAM 316
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 317
* ,5X, 15H, 40          TAFAM 318
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 319
* ,5X, 15H, 40          TAFAM 320
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 321
* ,5X, 15H, 40          TAFAM 322
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 323
* ,5X, 15H, 40          TAFAM 324
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 325
* ,5X, 15H, 40          TAFAM 326
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*
* ,/ , 5X, 1H*, 2X      TAFAM 327
* ,5X, 15H, 40          TAFAM 328
* ,4OH, GGGGGGGGGGG   .1X
* ,26X
* ,13HMMM MMMM MMMM
* ,14X, 1H*, 14X, 1H* ) TAFAM 329
* 175 FORMAT ( 5X, 1H*, 120X, 1H*, ./5X, 122(1H*) )
C RETURN
END
330
331
332
333
334
335
```

```

      SUBROUTINE TAFAM   74 / 74   OPT=1

130          *.,/ 5X, 1H*, .2X
              * .65X     AAA     AAA
              A, 13H     AAA     AAA
              *.,13X
              M, 13HNNNNN  MMMMM
              *.,14X, 1H*)
150  FORMAT ( *.,/ 5X, 1H*, .2X
              * .65X     AAA     AAA
              A, 13H     AAA     AAA
              *.,13X
              M, 13HNNNNN  MMMMM
              *.,14X, 1H*
              *.,/ 5X, 1H*, .2X
              * .65X     AAA     AAA
              A, 13H     AAA     AAA
              *.,13X
              M, 13HNNNNN  MMMMM
              *.,14X, 1H*)
2235         *.,/ 5X, 1H*, .2X
              * .65X     AAA     AAA
              A, 13H     AAA     AAA
              *.,13X
              M, 13HNNNNN  MMMMM
              *.,14X, 1H*
              *.,/ 5X, 1H*, .2X
              * .65X     AAA     AAA
              A, 13H     AAA     AAA
              *.,13X
              M, 13HNNNNN  MMMMM
              *.,14X, 1H*)
240          *.,/ 5X, 1H*, .2X
              * .65X     AAA     AAA
              A, 13H     AAA     AAA
              *.,13X
              M, 13HNNNNN  MMMMM
              *.,14X, 1H*
              *.,/ 5X, 1H*, .2X
              * .8(3HGGG),  4OHGGGGGG
              A, 13H     AAA     AAA
              *.,13X
              M, 13HNNNNN  MMMMM
              *.,14X, 1H*)
245          *.,/ 5X, 1H*, .2X
              * .8(3HGGG),  4OHGGGGGG
              A, 13HAAA   AAA
              *.,13X
              M, 13HNNNNM  MMMMM
              *.,14X, 1H*)
255          *.,/ 5X, 1H*, .2X
              * .8(3HGGG),  4OHGGGGGG
              A, 13HAAA   AAA
              *.,13X
              M, 13HNNNNM  MMMMM
              *.,14X, 1H*
              *.,/ 5X, 1H*, .2X
              * .24X,    4OH     GGG
              A, 13HAAA   AAA
              *.,13X
              M, 13HNNNM   MM  MMM
              *.,14X, 1H*
              *.,/ 5X, 1H*, .2X
              * .24X,    4OH     GGG
              A, 13HAAA   AAA
              *.,13X
              M, 13HNNNM   MM  MMM
              *.,14X, 1H*)
260          *.,/ 5X, 1H*, .2X
              * .5X,    4OH     GGG
              *.,15H     4OH     GGG
              *.,26X
              M, 13HNNNM   MM  MMM
              *.,14X, 1H*
              *.,/ 5X, 1H*, .2X
              * .5X,    15H     GGG
              *.,26X
              M, 13HNNNM   MM  MMM

```

GGGGGGGGGGGG , 1X  
GGGG . 1X  
. 1X  
. 1X  
. 1X

SUBROUTINE POOL				74/74	OFT=1	RELOCATION	FTN 4.8+577	85/01/23	OB. 10.44	PAGE	5
VARIABLES	SN	TYPE					REFS	127	129	155	1/O PEFS
750	IDVIBA	INTEGER				CFILES	REFS	7	18	91	101
1	IFILES	INTEGER				FLUT	REFS	5	24	85	104
244	IFLMD	INTEGER					REFS	141	144	153	126
754	II	INTEGER					REFS	140	140	140	
725	IN	INTEGER					REFS	53	53	51	
0	IPOS	INTEGER					REFS	7	15		
745	IRW	INTEGER					REFS	86	87	96	97
2	ITAPEP	INTEGER					REFS	23	1/O REFS	51	99
0	ITAPER	INTEGER					REFS	84	85	61	110
0	ITAPES	INTEGER					REFS	7	14	29	112
7	ITAPET	INTEGER					REFS	21		30	
1	ITAPEW	INTEGER					REFS	23	41	43	156
731	I1	INTEGER					REFS	42	73	119	118
734	I2	INTEGER					REFS	2*67	91	93	105
737	I3	INTEGER					REFS	134	136	144	106
747	J	INTEGER					REFS	66	89	93	152
751	JCVIBA	INTEGER					REFS	146	150	153	136
732	J1	INTEGER					REFS	142	146	153	
735	J2	INTEGER					REFS	141	145	105	106
740	J3	INTEGER					REFS	116	138	108	106
727	K	INTEGER					REFS	2*68	101	114	116
7	KBPAGE	INTEGER					REFS	92	101	98	111
752	KDVIBA	*					REFS	87	99	112	172
0	KFILES	INTEGER					REFS	127	155	129	
4	KLABEL	INTEGER					REFS	2*67	127	155	
0	KOUNT	INTEGER					REFS	66	66	66	
11	KOUNTH	INTEGER					REFS	2*68	127	155	
12	KOUNTI	INTEGER					REFS	66	66	66	
1	KPAGE	INTEGER					REFS	63	63	63	
0	KTABLE	INTEGER					REFS	18	19	44	44
5	KTABLEO	INTEGER					REFS	19	19	44	49
5	KTPAGE	INTEGER					REFS	19	19	44	49
0	LC	INTEGER					REFS	19	19	44	49
243	LC2	INTEGER					REFS	19	19	44	49
2	LINES	INTEGER					REFS	21	21	47	49
10	LINESG	INTEGER					REFS	13	31	62	71
3	LINEST	INTEGER					REFS	13	31	62	71
753	LOCFIL	*					REFS	124	124	124	171
0	LTIT'E	INTEGER					REFS	173	173	173	
0	LTSHF	INTEGER					REFS	17	35	35	
720	MTAP4	INTEGER					REFS	86	88	97	
721	MTAP49	INTEGER					REFS	29	129	130	113
17550	NC	INTEGER					REFS	169	173	131	140
730	NCARD	INTEGER					REFS	12	63	130	167
74	NCARD	INTEGER					REFS	61	96	169	174

SUBROUTINE	POOL	74/74	OPT=1	FTN 4.8+577	85/01/23 . 08.10.44	PAGE
VARIABLES	SN	TYPE	RELOCATION			6
3 NCOLS	INTEGER	CTABLE	REFS	21	DEFINED	46
4 NCOLST	INTEGER	CTABLE	REFS	21	DEFINED	46
716 NM	INTEGER	CTABLE	REFS	86	90	97
		REFS	113	131	139	140
723 NMD	INTEGER	CLIST	REFS	131	133	143
6 NPAGE	INTEGER	CTABLE	REFS	130	137	151
6 NPAGEA	INTEGER	CTABLE	REFS	2*36	37	110
1 NPASS	INTEGER	CTABLE	REFS	21	DEFINED	33
2 NROWS	INTEGER	CTABLE	REFS	5	12	135
17500 OMG	REAL	MODD	REFS	5	37	115
QZ	REAL	REFS	5	152	169	172
1 TITLE	REAL	ARRAY	CTITLE	63	92	
1 TSFH	REAL	ARRAY	CTSHF	8	16	
0 UMOD	COMPLEX	ARRAY	FLUT	10	24	
733 VALU1	REAL	REFS	67	DEFIN	66	
736 VALU2	REAL	REFS	68	DEFIN	66	
741 VALU3	REAL	REFS	69	DEFIN	66	
240 VF	REAL	FLUT	REFS	24		
120 VMOD	COMPLEX	ARRAY	FLUT	10	24	
14400 WW	REAL	ARRAY	MODD	5	12	
241 WW1	REAL	FLUT	REFS	105		
722 ZERO	REAL	FLUT	REFS	24		
VARIABLES USED AS FILE NAMES. SEE ABOVE				36	37	69
EXTERNALS		TYPE	ARGS	REFERENCES		
DVALUE		3	36	38		
FCLOSE		3	155			
FLINFO		0	179			
FSIO		6	127			
GDLAB		6	86			
GETROW		4	88			
PLB		3	41			
PROGNA		2	39			
PTABLE		3	48			
RNRW		3	152			
TITLES		1	40			
STATEMENT LABELS		DEF LINE	REFERENCES			
303 3		137	133	134		
335 5		149	139	141		
331 6		147	143	144		
0 7		151	90	110		
171 9		94	100	113		
651 20	FMT	184	41	72	118	156
0 25	FMT	70	65			
653 40	FMT	185	63	71		
0 60		63	62			
57 300		61	53			
252 500		125	53			
362 600		166	74	120		
142 610		79	53			
0 630		95	87			
0 655		169	168			
222 660		107	103	104		

## SUBROUTINE POOL

74/74 OPT=1

## STATEMENT LABELS

	DEF LINE	REFERENCES
0 675	172	171
243 680	117	112 114
0 685	173	170
226 690	109	99 101
655 710	186	66
660 1000	187	73
FMT		
660 1100	188	119
FMT		
676 1200	190	157
FMT		
706 2000	192	42

## LOOPS LABEL INDEX

	FROM-TO	LENGTH	PROPERTIES
62 60	62 63	12B	EXT REFS
76 25	65 70	32B	EXT REFS
154 630	87 95	22B	EXT REFS NOT INNER
165 9	90 94	5B	INSTACK
203 690	99 109	26B	INSTACK
216 660	103 107	5B	INSTACK
234 680	112 117	12B	INSTACK EXT REFS
300 3	133 137	4B	INSTACK
307 5	139 149	31B	INSTACK
325 6	143 147	5B	INSTACK
341 7	151 154	14B	EXT REFS
365 655	168 169	7B	EXT REFS
375 685	170 173	15B	EXT REFS NOT INNER
402 675	171 172	3B	INSTACK

## COMMON BLOCKS LENGTH

	MEMBERS - BIAS NAME(LENGTH)		
MODD	0 B (3200)	3200 DETAD (3200)	6400 WW (1600)
COMA	8041	8040 NC (1)	
CTAPES	41	40 BR (1)	
FILE	50	O ITAPES (50)	
CTITLE	20	O IP05 (20)	
CTSHF	37	O LTITLE (1)	
CFILES	2	O LTSHF (1)	
CLIST	51	O KFILES (1)	
	11	O KOUNT (1)	
		3 LINEST (1)	1 TITLE (36)
		6 NPAGE (1)	1 TSHF (1)
		9 KOUNTH (1)	1 IFILES (50)
		O KTABLE (1)	1 KPAGE (1)
		3 NCOLS (1)	4 KLABEL (1)
		6 NPAGEA (1)	7 KBPAGE (1)
		O ITAPER (1)	10 KOUNTI (1)
		O UMOD (80)	2 NPASS (1)
		161 WW1 (1)	4 NCOLST (1)
		164 IFLMD (40)	7 ITAPET (1)
			1 ITAPEW (1)
COMRWP	3		2 ITAPEP (1)
FLUT	204		80 VMOD (80)
			162 CSCL (1)
			163 LC2 (1)

## STATISTICS

PROGRAM LENGTH	9353
CM LABELED COMMON LENGTH	22211B
52000B CM USED	20424B 8468

SUBROUTINE FLINFO 74/74 OPT=1

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```
1      C      SUBROUTINE FLINFO          2
      C      COMPLEX B(40,40),DETAD(40,40)          3
      C      COMPLEX DELB          4
      5      C      DIMENSION ITAPES(50)          5
      C      DIMENSION OMGC(40),DMGR(40),NQA(40),GDP(40),WW(40,40)          6
      C      DIMENSION NOTI(25),NINZ(10,25),RATOM(20),QMWT(40,5),QWT(5)          7
      C      DIMENSION LC(40)          8
      10     C      DIMENSION RVBO(15),VBO(30),RHOR(10)          9
      C      DIMENSION V(25),TITLE1(18),TITLE2(18)          10
      C      DIMENSION TSHF(1)          11
      C      DIMENSION DELK(3,3),DELOM(3,3),OMRBSQ(3)          12
      C
      15     C      COMMON /CTAPES/ ITAPES          13
      C      COMMON /COMA/ LC,BR          14
      C      COMMON /MODD/ B,DETAD,'WW',OMGR,NC          15
      C      COMMON /FLUTAN/ FMACH,BETA,VBO,RVBO,NRVBO          16
      C      COMMON /FLUTB/ V,NV,DV          17
      C      COMMON /FLUTC/ RHOR,NOTI,NINZ,RATOM          18
      C      COMMON /FLUTV/ VA,VB,FLO,FHI,IE,NQZ,NVTOT          19
      C      COMMON /FLUTO/ QMWT,QWT          20
      C      COMMON /CALCP/ TITLE1,TITLE2,DUB,FUB,VUB,DLB,FLB,VLB,IPILOT,LSD,          21
      C      DSCALE,FSCALE,VSCALE,OPLEN,FRLEN,VLEN,XDT          22
      C      COMMON /PRPL/ GMAX,GMIN,FRMAX,FRMIN,VMAX,VMIN          23
      C      COMMON /CLIST/ KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE          24
      C      COMMON /CTABLE/ KTABLE,NPASS,NROWS,NCOLS,NCOLST,KTABLO,NPGEA          25
      C      COMMON /COMRWP/ ITAPER,ITAPERW,ITAPEP          26
      C      COMMON /REPORT/ KREPOR          27
      C      COMMON /CHEAD/ KHEAD,KRETUR,KOLUMN,IR,JCL,JCU,LSUB,LSKIP          28
      C      COMMON /CTSHF/ LTSHF,TSHF          29
      C      COMMON /QELIM/ QDW,VQDW,LC38          30
      C
      35     C      EQUIVALENCE(OMGC(1),OMGR(1))          31
      C
      40     C      LC38 = LC(38)          32
      C      ITAP1=ITAPES(37)          33
      C      ZERO = 0.0          34
      C      ONE = 1.0          35
      C      NQED = 5          36
      C      NMD = 40          37
      45     C      CALL DVALUE(GDP,ZERO,NMD)          38
      C      CALL DVALUE(QWT,ONE,NQED)          39
      C      CALL DVALUE(QMWT,ONE,NMD*NQED)          40
      C      TWOPI = 6.283184          41
      C      KOLUMN = 8          42
      C      IF (KREPOR.EQ.2) KOLUMN = 4          43
      C      CALL PROGNA(4H(FLI,4HINFO))          44
      50     C      READ (ITAPER,1) BR , FMACH          45
      C      BR = BR / 12.0          46
      C      NM = LC(2)          47
      C      ARG = ABS(FMACH*FMACH - 1.0)          48
      C      BETA = SQRT(ARG)          49
      C
      55     C
      C
```

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SUBROUTINE FLINFO      74/74    OPT=1
FTN 4 . 8+577

C IF(LC(1) .EQ. 1) LC(33)=0
C IF(LC(1) .EQ. -1) LC(33)=0
C IF(LC(1) .EQ. 2) LC(13) = 0
C IF(LC(1) .EQ. -2) LC(33)=1
C IF(LC(1) .EQ. 2) LC(13)=1
C IF(LC(1) .EQ. 2) GO TO 21
C IF(LC(33) .EQ. 1) GO TO 73
C IF(LC(1) .EQ. -1) GO TO 29
C
C REDUCED VELOCITIES
C
C 300 NVRBO= LC(4)
C     READ(ITAPER,1) (VBO(I), I= 1,NVRBO)
C     IF(LC(1) .EQ. 0) GO TO 73
C     IF(LC(13) .EQ. 1) GO TO 10
C     GO TO 11
C
C PK DATA
C
C 29 LC(13)= 1
C     READ(ITAPER,49) NV, V1, DV
C     V(1) = V1
C     DO 51 I= 2,NV
C 51 V(I)= V(I-1) + DV
C
C REFERENCE REDUCED VELOCITIES
C
C 10 READ (ITAPER,9) NRVBO
C     READ (ITAPER,1) (RVBO(I), I=1,NRVBO)
C     IF ((LINES-KOUNT) .LT. 4) KOUNT = LINES
C     CALL TITLES (3)
C     CALL PLB (1,1,ITAPEW)
C     KOUNT = KOUNT + 4
C     WRITE (ITAPEW,4000)
C     CALL PLB (1,1,ITAPEW)
C     KOUNT = KOUNT + 4
C     WRITE (ITAPEW,43) (RVBO(I),I=1,NRVBO)
C     NROWS = 1
C     NCOLS = 0
C     KTABLE = 2
C
C 1  HREDUCED VELOCITIES FOR INTERPOLATION OF GENERALIZED F
C READ FROM CARDS CHANGES FOR THE GENERALIZED MASS AND FREQUENC
C
C 11 IF (LC(31) .EQ. 0) GO TO 7
C     READ (ITAPER,50)
C     MADD = IADD . MSYM
C     IF (MADD .EQ. 0) GO TO 3
C     DO 4 II = 1,MADD
C 4  READ (ITAPER,5) I,J,WW(I,J)
C     IF (MSYM .EQ. 1) GOTO 3
C     DO 6 I = 1,NM
C 6   J = 1,NM
C     IF ( J .GE. I ) GO TO 6
C     WW(I,J) = WW(J,I)
C
C 6 CONTINUE
C
C 7 IF ( IADD .EQ. 0 ) GO TO 7
C     DO 8 I = 1,NM
C 8   J = 1,NM

```

SUBROUTINE FLINFO 74/74 QPT=1  
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115      8 READ (ITAPER,9) II, OMGC(II)
        7 CONTINUE
        C READ STRUCTURAL DAMPING AND CALCULATE UPPER TRIANGLE OF COMPLEX
        C STIFFNESS MATRIX (SPRING TERMS)
        C
120      IF ( LC(16) .EQ. 0 ) GO TO 21
        IF ( LC(16) .LT. 0 ) GO TO 22
        READ (ITAPER,1) GDD
        DO 23 I = 1,NM
        23 GDP(I) = GDD
        GO TO 24
        22 READ (ITAPER,50) NCD
        DO 25 I = 1,NCD
        25 READ (ITAPER,9) II, GDP(II)
        24 CONTINUE
        21 IF (LC(1).EQ.-1) GOTO 28
        IREF = LC(11)
        OMGR2 = (OMGC(IREF)*TWOPI)**2
        OREF = 1.0/OMGR2
        28 DO 31 I=1,NM
        DO 31 J = 1,NM
        B(I,J) = CMPLX (0.0,0.0)
        IF (I.NE.J) GO TO 31
        OMGR2 = (OMGC(I)*TWOPI)**2
        BB = WW(I,J)*OMGR2
        IF (LC(1).NE.-1) BB = BB * OREF
        BD = BB * GDP(I)
        B(I,J) = CMPLX (BB , BD )
        31 CONTINUE
        C
145      C IF BOTH RIGID-BODY TRANSLATION MODES AND RIGID-BODY ROTATION MODES
        C ARE INCLUDED IN FLUTTER ANALYSIS, AND IF AN ARTIFICIAL NONZERO
        C FREQUENCY HAS BEEN SPECIFIED FOR A RIGID-BODY TRANSLATION MODE,
        C CALCULATE INCREMENTAL RIGID-BODY GENERALIZED STIFFNESS TERMS.
        C RESULTS ARE DEVELOPED FROM OFF-DIAGONAL GENERALIZED-MASS TERMS.
        C AND WILL BE ZERO IF PLUG LOCATION AT WHICH RIGID-BODY MODES
        C ARE SPECIFIED IS COINCIDENT WITH AIRPLANE CG.
        C
155      READ (ITAPER,50) NRBT, NRBTOT
        IF (NRBT.EQ.0) GO TO 115
        SUMOMG = 0.0
        DO 87 I=1,NRBT
        SUMOMG = SUMOMG + OMGC(I)
        87 CONTINUE
        IF (SUMOMG.EQ.0.0) GO TO 115
        NRBTOT = NRBTOT - NRBT
        IF (NRBTOT.EQ.0) GO TO 115
        NRDT1 = NRBT + 1
        TWPISQ = TWOPI*TWOPI
        DO 90 I=1,NRBTOT
        OMRBTSQ(I) = OMGC(I)*OMGC(I)*TWPISQ
        DO 89 J=1,NRBTOT
        DELK(I,J) = 0.0
        DELOM(I,J) = 0.0
        89 CONTINUE
        90 CONTINUE
  
```

SUBROUTINE FLINFO 74/74 OPT=1

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```
DO 93 I=1,NRBTOT          173
DO 92 J=NROT1,NRBTOT        174
DELK(I,J) = WW(I,J)*OMRBSQ(I) 175
DELK(J,I) = DELK(I,J)         176
92 CONTINUE                  177
93 CONTINUE
   IF (NRBTOT.NE.2) GO TO 95
   DELK(2,3) = WW(2,3)*OMRBSQ(1)
   DELK(3,2) = DELK(2,3)
95 CONTINUE
DO 96 J=NROT1,NRBTOT        178
   DELK(J,J) = 0.0
96 CONTINUE
DO 98 I=1,NRBTOT          179
   DELOM(I,J) = OMRBSQ(I) - OMRBSQ(J)
   DELK(I,J) = DELK(J,J) + DELOM(I,J)*WW(I,J)/WW(J,I)
98 CONTINUE
97 CONTINUE
DO 110 I=1,NRBTOT          180
   DO 109 J=1,NRBTOT        181
      IF ((LC(1).NE.-1) .AND. DELK(I,J) .EQ. OREF
      IF (I.NE.J) GO TO 108
      ODEL = DELK(I,J)*GDP(I)
      DELB = CMPLX(DELK(I,J),OELD)
      B(I,J) = B(I,J) + DELB
      GO TO 109
108 CONTINUE
      B(I,J) = B(I,J) + DELK(I,J)
109 CONTINUE
110 CONTINUE
115 CONTINUE
   IF (LC(1) .EQ. 2) GO TO 42
C. PREPARE INFORMATION FOR PLOTTING FLUTTER RESULTS
C. PRINT PLOT SPECIFICATIONS
C. READ TITLES
C. CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C. LTITLE = 18
C. CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C. LTITLE = 8
CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C. CALCOMP SPECIFICATIONS
C. READ (ITAPER,30) (TITLE1(I); I=1,LTITLE)
C. READ (ITAPER,30) (TITLE2(I); I=1,LTITLE)
C. C
200
205
210
215
220
225
```

```

C READ TYPE PLOTS AND LIMITS OF PLOTTED VARIABLES          230
C READ (ITAPER,55) LSD . DUB . FUB . VUB . DLB
FLB= 0.0
VLB= 0.0

235   C READ SCALING INFORMATION
C
C READ (ITAPER,1) DSCALE , FSSCALE , VSCALE
DEL=0.0001
IDPLEN=(DUB-DLB)/DSCALE + DEL
IFRLEN=(FUB/FSSCALE) + DEL
IVLEN =(VUB/VSCALE) + DEL
IDPLEN = MAXO (1.IDPLEN)
IFRLEN = MAXO (1.IFRLEN)
IVLEN = MAXO (1.IVLEN)
DPLEN = IDPLEN
FRLEN = IFRLEN
VLEN = IVLEN
FUB = FSSCALE * FRLEN
VUB = VSCALE * VLEN
IDUB=(DUB/DSCALE) + DEL
IF ( IDUB .EQ. 0 ) IDUB = SIGN ( 1.0.DUB )
DUB = IDUB
DUB = DUB * DSCALE
DUB = DUB - DPLEN * DSCALE
IF ( ABS(DLB)/DSCALE .LT. 1.0 ) DLB = SIGN( 1.0.DLB ) * DSCALE
DPLEN = (DUB - DLB) / DSCALE
GO TO (101, 102, 103), LSD
101 XDT = VLEN + 1.0
VLN = FRLEN + DPLEN + 0.5
IF ( VLN .GT. 9.0 ) GO TO 60
GO TO 42
102 XDT = DPLEN + FRLEN + 3.5
IF ( VLEN .GT. 9.0) GOTO 60
GO TO 42
103 XDT = VLEN + 0.5
TEST = AMAX1 (DPLEN , FRLEN) + 0.5
IF ( TEST .LE. 9.0 ) GO TO 42
60 LC(14) = 0
WRITE (ITAPER,62)

265   C DENSITIES
C
C 42 NRO= LC(5)
C READ(ITAPER,1) (RHOR(I), I= 1,NRO)
275   C CHANGES TO THE GENERALIZED AIR FORCES
C
IF (LC(34) .EQ. 0) GOTO 70

280   C
READ (ITAPER,50) NOWT , NOE
C NOWT * NO. OF SURFACES FOR AERO MODAL ELIMINATION
C NOE = NO. OF SURFACES FOR WHICH AERO. WT. FUNCTION NE 1
IF ( NOWT .EQ. 0 ) GO TO 80
DO 72 I = 1, NOWT
PFAD (ITAPER,50) TCF NTCF (NIAA(I,1) ,I=1 NTCF)
725

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```

DO 72 K = 1,NISF          287
  NQAK = NQA(K)           288
  72 QWTF(NQAK,ISF) = 0.   289
  80 IF (NQE.EQ.0) GOTO 70 290
  DO 82 J = 1,NQE          291
  82 READ (ITAPER,B3)     1 . QWT(1)
  70 CONTINUE               292
C
C  MODIFY DETERMINANT (MAYBE)          293
C
C  DO 32 I=1,NMD          294
C    DO 32 J=1,NMD          295
C      32 DETAD(I,J) = CMPLX (0.0,0.0) 296
C        IF (LC(9).EQ.0) GO TO 48       297
C        READ (ITAPER,50) NADD , NSYM   298
C        DO 45 II = 1,NADD          299
C          45 READ (ITAPER,46) I , J , DETAD(I,J) 300
C            IF (NSYM .NE. 0) GO TO 48       301
C            DO 47 I = 1,NM          302
C              DO 47 J = 1,NM          303
C                IF ( J .GE. I ) GO TO 47       304
C                DETAD(I,J) = DETAD(J,I)      305
C                47 CONTINUE               306
C                48 CONTINUE               307
C
C  READ FROM CARDS CHANGES TO THE COMPLEX STIFFNESS MATRIX AND CALCULATE
C  LOWER TRIANGLE BASED UPON SYMMETRY OPTION          308
C
C  IF (LC(32) .EQ. 0) GOTO 35          309
C  READ (ITAPER,50) NADD , NSYM          310
C  DO 33 K = 1,NADD          311
C    33 READ (ITAPER,34) I , J , B(I,J) 312
C      FOR SYMMETRIC CONDITIONS SPECIFY TRIANGLE OF B MATRIX
C      IF ( NSYM .NE. 0 ) GO TO 35          313
C      DO 36 I = 1,NM          314
C        DO 36 J = 1,NM          315
C          IF ( J .GE. I ) GO TO 36       316
C          B(I,J) = B(J,I)          317
C          36 CONTINUE               318
C          35 CONTINUE               319
C
C  DEFINE NUMBER OF STIFFNESS VARIATION CYCLES          320
C
C  IF(LC(26).EQ.0) GO TO 66          321
C  NMMA = LC(26)          322
C  READ (ITAPER,1) (RATOM(I) , I=1,NOMA)          323
C  66 CONTINUE               324
C
C  DEFINE MODE ELIMINATION CYCLES          325
C
C  IF(LC(25).EQ.0) GO TO 63          326
C  NMIT = LC(25)          327
C  DO 64 IIT = 1,NMIT          328
C    READ (ITAPER,50) NOTIR, (NINZ(J,IIT), J=1,NOTIR)
C    64 NOTI(IIT) = NOTIR          329
C    CONTINUE               330

```

```

C AUTOMATIC EXCLUSION OF MODES BASED ON RATIOS OF
C GENERALIZED FORCES TO GENERALIZED MASSES
C
C IF (LC(1).NE.-1.OR.LC(38).NE.1) GO TO 65
C READ (ITAPER,1) QDW, VQDW
C 65 CONTINUE
C
C RANGE IN WHICH EIGENVECTORS ARE DESIRED
C
C IF(LC(28).EQ.0) GR TO 67
C IF (LC(1).EQ. 2) GO TO 67
C READ (ITAPER,1) VA ,VB
C IF (LC(1).LT. 0 AND. VA .LT. V(1)) VA = V(1)
C IF (LC(1).LT. 0 AND. VB .LT. V(NV)) VB = V(NV)
C IF (LC(1).EQ. -1) GO TO 67
C READ (ITAPER,1) FLO , FHI
C 67 CONTINUE
C
C LIST GENERALIZED MASSES, FREQUENCIES, DAMPING, AND COMPLEX STIFFNESS
C
C CALL PLB (1,1,ITAPEW)
C WRITE (ITAPEW,4100)
C CALL PLB (1,1,ITAPEW)
KOUNT = KOUNT + 4
ROWS = 1
NCOLS = 0
KTABLE = 2
CALL PTABLE (2,60,60
1 HGENERALIZED MASS, FREQUENCY, AND GENERALIZED MODAL STIFFNESS)
LSKIP = 1
LSUB = 4
KRETUR = 0
215 CALL HEAD (LTSHF, TSHF, NM,NM)
GO TO (216, 217, 218), KHEAD
216 WRITE (ITAPEW,1000)
217 CALL PLB (1,1,ITAPEW)
WRITE (ITAPEW,1001) (JC, JC=JCL, JCU)
218 WRITE (ITAPEW,1002) 1R, (WW(IR,JC), JC=JCL, JCU)
IF (KRETUR .LT. 3) GO TO 215
C
LSUB = 5
225 CALL HEAD (LTSHF, TSHF, NM,3)
GO TO (236, 237, 238), KHEAD
236 WRITE (ITAPEW,2000)
237 CALL PLB (1,1,ITAPEW)
238 OMGRAD = OMGC(IR)*TWOP
WRITE (ITAPEW,1002) IR, OMGC(IR), OMGRAD, GDP(IR)
OMGR(IR) = OMGRAD
IF (KRETUR .LT. 3) GO TO 235
C
KSAVE = KOLUMN
KOLUMN = KOLUMN/2
LSUB = 4
315 CALL HEAD (LTSHF, TSHF, NM,NM)
GO TO (316, 317, 318), KHEAD
316 WRITE (ITAPEW,3000)

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FLINFO 344
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FLINFO 400

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400          317 CALL PLB (1.1,ITAPEW)
              WRITE (ITAPEW,3001) (JC, JC=JCL,JCU)          401
              WRITE (ITAPEW,3002) 1R, (B(IR,JC), JC=JCL,JCU) 402
              IF (KRETUR .LT. 3) GO TO 315                  403
              KOLUMN = KSAVE                                404
              73 CONTINUE                                    405
              FLINFO 406
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              FLINFO 457

C           WRITE OUT NECESSARY COMMON BLOCKS TO ENABLE PROGRAM TO PLOT
C           ALL CALCOMPS FOLLOWING CALCULATIONS
C           IF (LIC(14).EQ.0) GO TO 71

410          REWIND MTAP1
              WRITE (MTAP1) (LC(I),I=1,40), BR, GMAX, GMIN, FRMAX, FRMIN,
              1          VMAX, VMIN, FMACH, BETA, VBO, RVBO, NRVBO,
              2          (TITLE1(J),J=1,18), (TITLE2(J),J=1,18),
              3          DUB, FUB, DLB, FLB, VLB, IPLOT, LSD,
              4          DSCALE, FSSCALE, VSCALE, DPLEN, VLLEN, XDT

415          C FORMATS
              C
              1 FORMAT (7E10.3)
              5 FORMAT (2I5,E10.3)
              9 FORMAT (15,E10.3)
              CIBM BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
              CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
              CCDC BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
              30 FORMAT (7A10,1A2)
              CCDC ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
              34 FORMAT (2I5,2E10.3)
              43 FORMAT (1OX,1P8E13.4)
              46 FORMAT (2I5,2E10.3)
              49 FORMAT (15,2E10.3)
              50 FORMAT (10I5)
              55 FORMAT (15,4E10.3)
              62 FORMAT (1H1,//20X, 53H***** VERTICAL PLOT IS GREATER THAN NINE INC
              1HES ***** //20X, 57HCALCOMP COMMAND CANCELLED ***** REVISE INPUT
              2DATA *****; /////
              83 FORMAT (15,E10.3)
              1000 FORMAT ( 10X, 20HGENERALIZED MASS, LB)
              1001 FORMAT (10X,1X,4HMODE,2X,5HMODE=,1( 1I3,1X, 3(1H-),
              1 ,7( 1I4,1X, 9(1H-)))
              1002 FORMAT ( 10X, 15, 1P8E14. 6)
              2000 FORMAT (10X,1X,4HMODE,2X,SHFREQUENCY,5X,9HFREQUENCY,5X,BHDAMPING
              1 ,/,10X,5X ,2X,SHCYC/SEC ,5X,9HRAD/SEC ,5X,BHNO UNITS)
              3000 FORMAT (10X,56HCOMPLEX GENERALIZED MODAL STIFFNESS, (REAL, IMAG).
              1LB/IN)
              3001 FORMAT (10X,1X,4HMODE,2X,5HMODE=,1( 1I3,1X,17(1H-))
              1 ,3( 1I4,1X,23(1H-)))
              3002 FORMAT (10X,15,4(2X,1H(,1P1E11.4,1H,1X,1P1E11.4,1H)))
              4000 FORMAT (10X,58
              1 HREDUCED VELOCITIES FOR INTERPOLATION OF GENERALIZED FORCES
              2 ,/10X,58(1H-))
              4100 FORMAT (10X,60
              1 HGENERALIZED MASS, FREQUENCY, AND GENERALIZED MODAL STIFFNESS
              2 ,/10X,60(1H-))

455          C 71 RETURN

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END

FLINFO 458

## CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

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257   1      AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
377   1      AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
386   1      AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
398   1      AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

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## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS 1 FLINFO	DEF LINE 1	REFERENCES 456	RELOCATION	REFS	56	DEFINED 3	17	197	200	323	402
VARIABLES 2201 ARG 0 B	SN TYPE REAL COMPLEX	ARRAY	MODD	REFS DEFINED REFS REFS	137	143	197	200	317	323	323
2220 BB	REAL			REFS REFS	141	142	143	143	140	140	141
2221 BD	REAL			REFS REFS	143	DEFINED	142				
1 BETA	REAL			REFS REFS	18	411	DEFINED	56			
50 BR	REAL			REFS REFS	16	53	411	DEFINED	52	53	53
2232 DEL	REAL			REFS REFS	239	240	241	250	DEFINED	238	238
2170 DELB	COMPLEX			REFS REFS	4	197	DEFINED	196			
2230 DELD	REAL			REFS REFS	196	DEFINED	195				
2401 DELK	REAL	ARRAY		REFS REFS	13	175	180	188	193	195	196
				REFS REFS	200	DEFINED	168	174	175	179	183
2412 DELOM	REAL	ARRAY	MODD	REFS REFS	188	193	188	DEFINED	169	187	187
6200 DETAD	COMPLEX	ARRAY	CALCP	REFS DEFINED REFS	13	17	307	DEFINED	169	298	302
47 DB	REAL			REFS REFS	3	231	254	2*255	256	411	411
57 DPLEN	REAL			REFS DEFINED REFS	23	254	259	262	266	411	411
54 DSCALE	REAL			REFS REFS	245	256	259	250	253	254	256
44 DUB	REAL			REFS CALCP	23	239	239	239	250	253	256
32 DV	REAL			REFS FLUTB	411	DEFINED	231	250	251	253	256
3 FHI	REAL			REFS CALCP	19	80	252	253			
50 FLB	REAL			REFS FLUTV	21	DEFINED	359	359	77		
2 FLO	REAL			REFS FLUTV	23	411	DEFINED	359	232		
0 FMACH	REAL			REFS FLUTAN	18	2*55	411	DEFINED	52		
60 FRLEN	REAL			REFS CALCP	23	248	259	262	266	411	411
2 FMAX	REAL			PRPL PRPL	246						
3 FMIN	REAL			REFS CALCP	25	411	DEFINED	212			
55 FSCALE	REAL			REFS CALCP	25	411	DEFINED	211			
45 FUB	REAL			REFS CALCP	23	240	248	411	DEFINED	237	248
				REFS CALCP	23	240	411	DEFINED	231		

SUBROUTINE	FLINFO	74/74	OPT=1	FTN 4.8+577	85/01/23 . 08.10.44	PAGE	10	
VARIABLES	SN	TYPE	RELOCATION	REFS				
2331	GDP	REAL	ARRAY	DEFINED				
0	GMAX	REAL	PRPL	REFS	7	44	195	390
1	GMIN	REAL	PRPL	REFS	125	129		
2203	I	INTEGER	REFS	REFS	25	411	DEFINED	
			REFS	REFS	25	411	DEFINED	212
			REFS	REFS	69	2*80	DEFINED	212
			REFS	REFS	125	137	138	93
			REFS	REFS	168	169	139	140
			REFS	REFS	3*166	2*195	3*174	142
			REFS	REFS	194	196	2*197	143
			REFS	REFS	291	302	3*200	158
			REFS	REFS	331	411	2*307	2*193
			REFS	REFS	108	114	DEFINED	274
			REFS	REFS	185	191	124	322
			REFS	REFS	302	226	128	322
			REFS	REFS	304	317	227	106
			REFS	REFS	340	113	114	93
			REFS	REFS	242	113	DEFINED	106
			REFS	REFS	251	245	245	172
			REFS	REFS	251	252	DEFINED	296
			REFS	REFS	21	246	246	291
			REFS	REFS	243	115	DEFINED	251
			REFS	REFS	340	341	103	251
			REFS	REFS	23	411	115	242
			REFS	REFS	32	2*381	115	242
			REFS	REFS	133	133	114	242
			REFS	REFS	288	288	114	242
			REFS	REFS	30	1/O REFS	114	242
			REFS	REFS	30	106	115	242
			REFS	REFS	103	226	123	242
			REFS	REFS	300	302	231	242
			REFS	REFS	359	302	237	242
			REFS	REFS	6	15	274	242
			REFS	REFS	28	15	331	242
			REFS	REFS	30	88	331	242
			REFS	REFS	400	90	129	242
			REFS	REFS	381	387	132	242
			REFS	REFS	244	247	132	242
			REFS	REFS	129	247	132	242
			REFS	REFS	106	110	132	242
			REFS	REFS	168	169	132	242
			REFS	REFS	194	195	132	242
			REFS	REFS	306	2*307	132	242
			REFS	REFS	106	109	132	242
			REFS	REFS	192	285	132	242
			REFS	REFS	340	2*411	132	242
			REFS	REFS	380	381	132	242
			REFS	REFS	401	401	132	242
			REFS	REFS	402	402	132	242
			REFS	REFS	32	380	132	242
			REFS	REFS	32	380	132	242
			REFS	REFS	287	287	132	242
			REFS	REFS	26	317	132	242
			REFS	REFS	32	377	132	242
			REFS	REFS	394	395	132	242
			REFS	REFS	26	395	132	242
			REFS	REFS	404	404	132	242
			REFS	REFS	26	395	132	242
			REFS	REFS	86	86	132	242
			REFS	REFS	86	89	132	242
			REFS	REFS	26	89	132	242
			REFS	REFS	26	92	132	242
			REFS	REFS	11	367	132	242
			REFS	REFS	11	367	132	242

SUBROUTINE	FLINFO	74/74	OPT=1	FTN 4.8+577	85/01/23 . 08.10.44	PAGE	10	
VARIABLES	SN	TYPE	RELOCATION	REFS				
2331	GDP	REAL	ARRAY	DEFINED				
0	GMAX	REAL	PRPL	REFS	7	44	195	390
1	GMIN	REAL	PRPL	REFS	125	129		
2203	I	INTEGER	REFS	REFS	25	411	DEFINED	
			REFS	REFS	69	2*80	DEFINED	212
			REFS	REFS	137	138	139	93
			REFS	REFS	168	169	174	106
			REFS	REFS	194	195	174	106
			REFS	REFS	306	2*307	197	106
			REFS	REFS	106	109	197	106
			REFS	REFS	192	285	197	106
			REFS	REFS	340	2*411	290	106
			REFS	REFS	380	381	290	106
			REFS	REFS	401	401	290	106
			REFS	REFS	402	402	290	106
			REFS	REFS	32	380	290	106
			REFS	REFS	32	380	290	106
			REFS	REFS	287	287	290	106
			REFS	REFS	26	317	290	106
			REFS	REFS	377	386	290	106
			REFS	REFS	394	395	290	106
			REFS	REFS	404	404	290	106
			REFS	REFS	26	395	290	106
			REFS	REFS	26	395	290	106
			REFS	REFS	404	404	290	106
			REFS	REFS	26	395	290	106
			REFS	REFS	86	86	290	106
			REFS	REFS	86	89	290	106
			REFS	REFS	26	92	290	106
			REFS	REFS	26	92	290	106
			REFS	REFS	11	367	290	106
			REFS	REFS	11	367	290	106

SUBROUTINE FLINFO

74/74 OPT=1

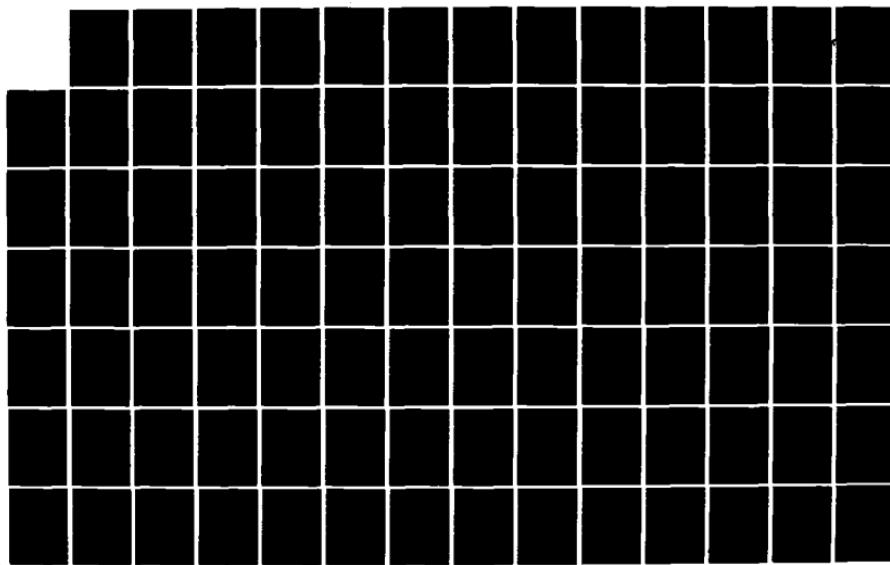
FTN 4.8+577

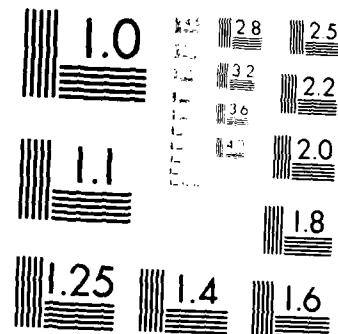
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VARIABLES	SN	TYPE	RELOCATION					
12 KOUNT1	1	INTEGER	CLIST	REFS	26			
1 KPAGE	1	INTEGER	CLIST	REFS	26			
0 KREPUR	0	INTEGER	REPORT	REFS	31	49		
1 KRETUR	1	INTEGER	CHEAD	REFS	32	382	392	DEFINED
2260 KSAVE	2	INTEGER	CTABLE	REFS	404	394	403	DEFINED
0 KTABLE	0	INTEGER	CTABLE	REFS	28	96	370	
5 KTABLUS	5	INTEGER	CLIST	REFS	26			
5 KTPAGE	5	INTEGER	ARRAY	REFS	9	16	58	59
LC	0	INTEGER	COMA	REFS	61	62	64	60
				REFS	121	122	132	102
				REFS	273	278	299	213
				REFS	2*347	353	314	338
				REFS	354	356	329	411
			DEFINED	REFS	58	59	358	409
				REFS	60	61	409	268
2 LC38	2	INTEGER	QELEM	REFS	34	38		
2 LINES	2	INTEGER	CLIST	REFS	26			
10 LINESG	10	INTEGER	CLIST	REFS	26			
3 LINEST	3	INTEGER	CLIST	REFS	23	257	411	DEFINED
53 LSD	53	INTEGER	CALCP	REFS	32	32	373	231
7 LSKIP	7	INTEGER	CHEAD	REFS	32	32	374	396
6 LSUB	6	INTEGER	CHEAD	REFS	226	227	227	396
2231 LTITLE	2231	INTEGER	CTSHF	REFS	33	376	385	224
0 LTSHF	0	INTEGER	INTGER	REFS	104	105	397	
2205 MADD	2205	INTEGER	INTGER	REFS	107	105	103	
2207 MSYM	2207	INTEGER	INTGER	REFS	39	103		
2172 MTAP1	2172	INTEGER	INTGER	REFS	316	1/O REFS	410	411
2250 NADD	2250	INTEGER	MODD	REFS	301	300	300	315
17550 NC	17550	NC	INTGER	REFS	17	128	127	
2213 NCD	2213	INTEGER	CTABLE	REFS	28	28	28	
3 NCOLS	3	INTEGER	CTABLE	REFS	28	28	95	369
4 NCOLST	4	INTEGER	FLUTC	REFS	8	20	20	
43 NINZ	43	INTEGER	ARRAY	REFS	285	286	340	
2245 NISF	2245	INTEGER	ARRAY	REFS	108	109	124	305
2200 NM	2200	INTEGER	NM	REFS	320	321	2*376	304
2176 NMD	2176	INTEGER	INTGER	REFS	44	46	385	54
2253 NMIT	2253	INTEGER	INTGER	REFS	339	338	296	43
2252 NOMA	2252	INTEGER	INTGER	REFS	331	330	330	
12 NOTI	12	INTEGER	NOTI	REFS	8	20	136	
2255 NOTIR	2255	INTEGER	INTGER	REFS	340	341	2*397	
6 NPAGE	6	INTEGER	NPAGEA	REFS	26	26	297	
6 NPAGEA	6	INTEGER	NPASS	REFS	28	28	297	
1 NPASS	1	INTEGER	NPASS	REFS	7	287	287	
2261 NQA	2261	INTEGER	ARRAY	REFS	288	288	285	
4247 NQAK	4247	INTEGER	ARRAY	REFS	289	290	280	
2243 NOE	2243	INTEGER	INTGER	REFS	45	46	46	
2175 NQED	2175	INTEGER	INTGER	REFS	283	284	42	
2242 NOWT	2242	INTEGER	INTGER	REFS	21	162	178	280
5 NQZ	5	INTEGER	FLUTV	REFS	161	165	167	
2225 NRBROT	2225	INTEGER	NRBROT	REFS	192	DEFINED	154	
2223 NRBTOT	2223	INTEGER	NRBTOT	REFS	155	157	161	
2222 NRBTR	2222	INTEGER	NRBTR	REFS	154	154	163	
2241 NRO	2241	INTEGER	NRCT1	REFS	274	273	182	186
2226 NROWS	2226	INTEGER	NROWS	REFS	173	182	173	191
2	2	INTEGER	CTABLE	REFS	28	28	94	163

AD-A152 278    ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER    6/8  
PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1  
UNCLASSIFIED N88019-81-C-0395    F/G 9/2    NL





MICROFICHE RESOLUTION TEST CHART  
No. M-1000-A-1000-A-1000-A

SUBROUTINE FLINFO		74 / 74	OPT = 1	FTN 4.8+577	85 / 01 / 23 . OB . 10 . 44	PAGE
VARIABLES	SN	TYPE	RELOCATION			
57	NRVBO	INTEGER	FLUTAN			
2251	NSYM	INTEGER	FLUTB			
31	NV	INTEGER	FLUTV			
2202	NVBO	INTEGER	MODD			
6	NVTOT	INTEGER	ARRAY			
17500	OMGC	REAL	ARRAY			
17500	OMGR	REAL	MODD			
2257	OMGRAD	REAL	ARRAY			
2216	OMGR2	REAL	ARRAY			
2424	OMRBSQ	REAL	REAL			
2174	ONE	REAL	REAL			
2217	UREF	REAL	REAL			
0	QDW	REAL	REAL			
0	QMWT	REAL	REAL			
310	QWT	REAL	REAL			
2013	RATOM	REAL	REAL			
0	RHOR	REAL	REAL			
40	RVBO	REAL	REAL			
2224	SUMOMG	REAL	REAL			
2240	TEST	REAL	REAL			
0	TITLE1	REAL	ARRAY			
22	TITLE2	REAL	ARRAY			
1	TSHF	REAL	ARRAY			
2177	TWOP1	REAL	REAL			
2227	TWPISQ	REAL	REAL			
0	v	REAL	REAL			
0	VA	REAL	FLUTB			
1	VB	REAL	FLUTV			
2	VBO	REAL	FLUTAN			
51	VLB	REAL	CALCP			
61	VLEN	REAL	CALCP			
2237	VLN	REAL	REAL			
4	VMAX	REAL	PRPL			
5	VMIN	REAL	PRPL			
1	VQDW	REAL	QELIM			
56	VSCALE	REAL	CALCP			
46	VUB	REAL	CALCP			
2204	V1	REAL	REAL			
14400	WW	REAL	ARRAY			
62	XDT	REAL	MODD			
2173	ZERO	REAL	REAL			
VARIABLES USED AS FILE NAMES, SEE ABOVE						
EXTERNALS	TYPE	ARGS	REFERENCES			
DVALUE	3	44	45	46		
HEAD	4	376	385	397		
PLB	3	88	91	364		
PROGNA	2	50				
PTABLE	3	97				
SORT	REAL	1 LIBRARY	56	371		
TITLES	1	87				

ROUTINE	FLINFO	74/74	OPT=1			FTN 4.8+577	85/01/23. 08.10.44	PAGE	13
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES					
ABS	REAL	1	INTRIN	55	255				
AMAX1	REAL	0	INTRIN	266					
CMPLEX	COMPLEX	2	INTRIN	137	143	196	298		
MAXO	INTEGER	0	INTRIN	242	243	244			
SIGN	REAL	2	INTRIN	251	255				
STATEMENT LABELS			DEF LINE	REFERENCES					
2001	1	FMT	419	52	69	85	123	212	237
210	3		113	355	359	104	105	107	
0	4		106						
2003	5	FMT	420	106					
203	6		112	108	109				110
223	7		116	102	113				
0	8		115	114					
2006	9	FMT	421	84	115				
107	10		84	71					
146	11		102	72					
252	21		131	62					
236	22		127	122					
0	23		125	124					
252	24		130	126					
0	25		129	128					
260	28		135	131					
74	29		76	64					
2010	30	FMT	426	226	227				
304	31		144	135	136				
0	32		298	296	297				
0	33		317	316					
2012	34	FMT	428	317					
1021	35		325	314	319				
1013	36		324	320	321				
625	42		273	204	213				
2015	43	FMT	429	93					
0	45		302	301					
2020	46	FMT	430	302					
750	47		308	304	305				
756	48		309	299	303				
2023	49	FMT	431	77					
2026	50	FMT	432	103	127				
0	51		80	79					
2030	55	FMT	433						
622	60		268	260	263				
2033	62	FMT	434						
1050	63		342	337					
0	64		341	339					
1056	65		349	347					
1030	66		332	329					
1077	67		360	353	354				
677	70		292	278	289				
1301	71		456	409					
0	72		288	284	286				
1274	73		405	63	70				
664	80		289	283					
0	82		291	290					
2052	83	FMT	437	437	291				

SUBROUTINE FLINFO	74/74	OPT=1	DEF LINE	REFERENCES
STATEMENT LABELS			159	157
0 87			170	167
0 89			171	165
C 90			176	173
0 92			177	172
0 93			181	178
400 95			184	182
0 96			189	186
0 97			190	185
0 98			258	257
576 101			262	257
605 102			265	257
613 103			199	194
463 108			201	192
465 109			202	191
0 110			203	155
473 115			376	382
1117 215			378	377
1131 216			379	377
1133 217			381	377
1146 218			385	392
1167 235			387	386
1201 236			388	386
1203 237			389	386
1205 238			68	403
0 300			399	398
1223 315			400	398
1235 316			402	398
1237 317			438	378
1252 318			439	380
2054 1000	FMT		441	381
2060 1001	FMT		442	387
2067 1002	FMT		444	399
2072 2000	FMT		446	401
2105 3000	FMT		448	402
2115 3001	FMT		449	90
2124 3002	FMT		452	365
2132 4000	FMT			
2143 4100	FMT			
LOOPS	LABEL	INDEX	FROM-TD	LENGTH
103 51	I	I	79 80	3B
153 4	I	I	105 106	1B
170 6	I	I	108 112	2B
200 6	J	J	109 112	5B
212 8	I	I	114 115	1B
232 23	I	I	124 125	3B
241 25	I	I	128 129	1B
261 31	I	I	135 144	3B
272 31	J	J	136 144	14B
320 87	I	I	157 159	3B
332 90	I	I	165 171	1B
341 89	J	J	167 170	3B
351 93	I	I	172 177	2B
364 92	J	J	173 176	4B
404 96	J	J	182 184	2B
410 98	I	I	185 190	2B
423 97	J	J	186 189	7B

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LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
437	110	I	191 202	34B	OPT NOT INNER
451	109	J	192 201	16B	EXT REFS
640	72	I	284 288	24B	INSTACK
654	72	K	286 288	4B	EXT REFS
666	82	J	290 291	11B	NOT INNER
700	32	I	296 298	14B	INSTACK
706	32	J	297 298	2B	INSTACK
717	45	I,I	301 302	13B	EXT REFS
734	47	I	304 308	22B	NOT INNER
744	47	J	305 308	6B	INSTACK
762	33	K	316 317	13B	EXT REFS
777	36	I	320 324	22B	NOT INNER
1007	36	J	321 324	6B	INSTACK
1033	64	IIT	339 341	15B	EXT REFS
1141	JC	380 380	4B	EXT REFS	
1152	JC	381 381	11B	EXT REFS	
1245	JC	401 401	4B	EXT REFS	
1256	JC	402 402	11B	EXT REFS	
COMMON BLOCKS					
CTAPES					
COMA	50	MEMBERS - BIAS NAME(LENGTH)	O ITAPES (50)	(1)	
MOOD	41		O LC (40)	40 BR (1)	
	8041		O B (3200)	3200 DETAD (3200)	6400 WW (1600)
FLUTAN					
FLUTAN	48		8000 OMGR (40)	8040 NC (1)	2 VBO (30)
FLUTB					
FLUTB	27		O FMACH (1)	1 BETA (1)	
FLUTC	1055		32 RVBO (15)	47 NRVBO (1)	
FLUTV					
FLUTV	7		O V (25)	25 NV (1)	26 DV (1)
			O RHOR (10)	10 NOTI (25)	35 NINZ (1000)
			1035 RATOM (20)		
			O VA (1)	1 VB (1)	2 FLO (1)
			3 FH1 (1)	4 IE (1)	5 NQZ (1)
FLUTO					
CALCP	205		6 NVTOT (1)	200 QWT (5)	36 DUB (1)
	51		O QMWT (200)	18 TITLE2 (18)	39 DLB (1)
			O TITLE1 (18)	38 VUB (1)	42 IPLOT (1)
			37 FUB (1)	41 VLB (1)	45 FSCALE (1)
			40 FBL (1)	47 DPLEN (1)	48 FRLEN (1)
PRPL					
	6		43 LSD (1)	44 DSCALE (1)	2 FRMAX (1)
			46 VSCALE (1)	50 XDT (1)	5 VMIN (1)
			49 VLEN (1)	1 GMIN (1)	2 LINES (1)
			O GMAX (1)	4 VMAX (1)	5 KPAGE (1)
			3 FRMIN (1)	1 KPAGE (1)	8 LINESG (1)
			O KOUNT (1)	4 KLABEL (1)	
			3 NCOLS (1)	7 KBPAGE (1)	
			6 NPAGE (1)	10 KOUNTI (1)	
			9 KOUNTH (1)	1 NPASS (1)	2 ROWS (1)
			O KTABLE (1)	4 NCOLST (1)	5 KTABLO (1)
			3 NPAGEA (1)	7 ITAPET (1)	2 ITAPEP (1)
			O ITAPER (1)	1 ITAPEW (1)	
			O KREPOR (1)	1 KRETUR (1)	2 KOLUMN (1)
			O KHEAD (1)	4 JCL (1)	5 JCU (1)
			3 IR (1)	7 LSKIP (1)	
			6 LSUB (1)	1 TSHF (1)	
			O LTSHF (1)	1 VQDW (1)	2 LC3B (1)
			O QDW (1)		

SUBROUTINE FLINFO

74/74 OPT=1

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EQUIV CLASSES LENGTH MEMBERS - BIAS NAME (LENGTH)

B OMGR 40 O OMGC (40)

STATISTICS

PROGRAM LENGTH

CM LABELED COMMON LENGTH

52000B CM USED

24508

225378

1320

9567

```

SUBROUTINE MOVIS   74/74    OPT=1          FTN 4.8+577

      C   SUBROUTINE MOVIS (IS,IM, ID, NBOXS, IFB, KLUE, XI)
      C   ROUTINE PRESENTS A VISUALIZATION OF THE MODE SHAPES
      C   OF A SURFACE BY PRINTING DEFLECTIONS IN DIGITAL
      C   FORMAT AT THE COLLOCATION POINTS ON THE PLANFORM.
      C   BOTH H AND ALPHA ARE PRINTED.
      C   R. CHIPMAN 1973.
      C
      C   CIBM
      C   DIMENSION TITLE(18)
      C   CIBM
      C   CCDC
      C   CCDC
      C   COMMON /MODV/ X(400) , Y(400)  , ZZ(400)
      C   COMMON /CTAPES/ ITAPES
      C   DIMENSION XI(NBOXS) , YV(200) , IPRINT(33)
      C   DIMENSION DEF(400)
      C   DIMENSION YZ(800)
      C   DIMENSION BLANK(37) , FMT(37)
      C   COMMON /COMRWP/ ITAPER , ITAPEW , ITAPEP
      C   COMMON /CLIST/ KOUNT , KPAGE , LINES , LINEST , KLABEL , KTPAGE
      C   1 COMMON /CTABLE/ KTABLE , NPASS , NROWS , NCOLS , NCOLST , KTABLO
      C   1 DIMENSION ITAPES(50)
      C   EQUIVALENCE (YZ(1),Y(1))
      C   DATA WORD /4H,113/
      C   DATA BLANK /4H(2X),4H10 . 4H4,8X, 33*4H,03X,4H,1X)/
      C   DATA KLU /4HKERN/
      C
      C   INITIAL CONDITIONS
      C
      C   KOUNT = LINES
      C   ITAP18 = ITAPES(18)
      C   IF (IS .GT. 1 .OR. IM .GT. 1 .OR. ID .GT. 2) GO TO 100
      C   CALL TITLES(2)
      C   CALL PLB (1,2,ITAPEW)
      C   WRITE (ITAPEW,4000)
      C   CALL PLB (1,1,ITAPEW)
      C   KOUNT = KOUNT + 5
      C   NROWS = 1
      C   NCOLS = 0
      C   KTABLO = 2
      C   CALL PTABLE (2,46,46)
      C   1 HGRAPHICAL REPRESENTATION OF INTERPOLATED MODES)
      C   KOUNT = LINES
      C   100 CONTINUE
      C
      C   FIND MAXIMUMS AND MINIMUMS
      C
      C   ILB= IFB + NBOXS - 1
      C   IH = O
      C   NH = N

```

SUBROUTINE MOVIS      74/74      OPT=1

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$$x_u = x(IIB) \\ y_u = y(IIB)$$

6

$$xyu = x(yfb)$$

DO 113 TIER II B

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```

V1 = Y(1)
Z1 = ZZ(1)
IF(D.LT.DL) DL = D
IF(X1.LT.XL) XL=X1
IF(Y1.LT.YL) YL=Y1
IF(Z1.LT.ZL) ZL=Z1
IF(D.GT.DU) DU = D
IF(X1.GT.XU) XU=X1
IF(Y1.GT.YU) YU=Y1
IF(Z1.GT.ZU) ZU=Z1
CONTINUE

```

CONTINUOUS DEFLECTIONS AND SET EXPONENT

```

C DL = ABS(DL)
      IF (DL.GT.DU) DU = DL
      IEX = 0
      IF (DU.GT.1.0) GO TO 2
      IF (DU.LT.0.1) GO TO 3

```

```

        IF (DU.GT.0.1) GO TO 3
        DO 4 I = 1,10
        IEX = - I
        DU = 10.*DU
        IF (DU.GT.0.1) GO TO 3

```

4 CONTINUE

GO TO 3  
2 DO 6 1 = 1, 10

IEX = 1

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```

6 CONTINUE
3 DO 10 1 = 1, NBOXS
      IF (LBU.LE.1.0) GO TO 3

```

```
10 DEF(I) = XI(I) * (10.0**(-I*EX))
```

IEX = IEX - 2

IEXX ≈ -IE<sub>X</sub>

GO TO (600,400,500); ID

00 CONTINUE

REWIND ITAP18

WRITE (ITAP 18,1000) IEXX, IS,

REWIND ITAP18

READ (ITAP18,3000) TITLE

CALL TITLES (-1)

CALL PLB (1;1, ITAPEW)

WRITE ('IPEW,2000) IEXX, IS, IN

```
CALL PLB ( 1.1. ITAPEW )
KOUNT = KOUNT + 4
```

```

115      NROWS = 0
          NCOLS = 2
          KTABLE = 2
          CALL PTABLE (2.58,TITLE)
          GO TO 600
C      500 CONTINUE
          REWIND ITAP18
          WRITE (ITAP18,1100) IEXX, IS, IM
          REWIND ITAP18
          READ (ITAP18,3000) TITLE
          CALL TITLES (-1)
          CALL PLB (1,1,ITAPEW)
          WRITE (ITAPEW,2100) IEXX, IS, IM
          CALL PLB (1,1,ITAPEW)
          COUNT = COUNT + 4
          NROWS = 0
          NCOLS = 2
          KTABLE = 2
          CALL PTABLE (2.58,TITLE)

130      C 600 CONTINUE
          C X-Y OR X-Z PLANE ?
          C
          CMAX = XU-XL
          SY = YU-YL
          SZ = ZU-ZL
          SPAN = SY
          IB1 = 0
          IF (SY.LT.SZ) IB1=400
          IF (SY.LT.SZ) YL = ZL
          IF (SY.LT.SZ) SPAN=SZ
          SCALE = 6.*SPAN/5.
          IF (CMAX.GT.SPAN) SCALE= 6.*CMAX/5.

135      C
          NSB = 0
          R = 0.0
          IU = 1
          YV(1) = 0.0
          IY = -1
          DO 120 I = 1,NBOXS
              MBOX = IFB + I - 1
              MBOX = MBOX + IB1
              YS = YZ(MBOX)
              IF (YS.EQ.R) GO TO 120
              DO 301 NU = 1,IU
                  RU = YV(NU)
                  IF (YS.EQ. RU) GO TO 120
                  C 301 CONTINUE
                  IU = IU + 1
                  YV(IU) = YS
                  NSB = NSB + 1
                  R = YS

140      C
          CMAX = XU-XL
          SY = YU-YL
          SZ = ZU-ZL
          SPAN = SY
          IB1 = 0
          IF (SY.LT.SZ) IB1=400
          IF (SY.LT.SZ) YL = ZL
          IF (SY.LT.SZ) SPAN=SZ
          SCALE = 6.*SPAN/5.
          IF (CMAX.GT.SPAN) SCALE= 6.*CMAX/5.

145      C
          NSB = 0
          R = 0.0
          IU = 1
          YV(1) = 0.0
          IY = -1
          DO 120 I = 1,NBOXS
              MBOX = IFB + I - 1
              MBOX = MBOX + IB1
              YS = YZ(MBOX)
              IF (YS.EQ.R) GO TO 120
              DO 301 NU = 1,IU
                  RU = YV(NU)
                  IF (YS.EQ. RU) GO TO 120
                  C 301 CONTINUE
                  IU = IU + 1
                  YV(IU) = YS
                  NSB = NSB + 1
                  R = YS

150      C
          NSB = 0
          R = 0.0
          IU = 1
          YV(1) = 0.0
          IY = -1
          DO 120 I = 1,NBOXS
              MBOX = IFB + I - 1
              MBOX = MBOX + IB1
              YS = YZ(MBOX)
              IF (YS.EQ.R) GO TO 120
              DO 301 NU = 1,IU
                  RU = YV(NU)
                  IF (YS.EQ. RU) GO TO 120
                  C 301 CONTINUE
                  IU = IU + 1
                  YV(IU) = YS
                  NSB = NSB + 1
                  R = YS

155      C
          NSB = 0
          R = 0.0
          IU = 1
          YV(1) = 0.0
          IY = -1
          DO 120 I = 1,NBOXS
              MBOX = IFB + I - 1
              MBOX = MBOX + IB1
              YS = YZ(MBOX)
              IF (YS.EQ.R) GO TO 120
              DO 301 NU = 1,IU
                  RU = YV(NU)
                  IF (YS.EQ. RU) GO TO 120
                  C 301 CONTINUE
                  IU = IU + 1
                  YV(IU) = YS
                  NSB = NSB + 1
                  R = YS

160      C
          NSB = 0
          R = 0.0
          IU = 1
          YV(1) = 0.0
          IY = -1
          DO 120 I = 1,NBOXS
              MBOX = IFB + I - 1
              MBOX = MBOX + IB1
              YS = YZ(MBOX)
              IF (YS.EQ.R) GO TO 120
              DO 301 NU = 1,IU
                  RU = YV(NU)
                  IF (YS.EQ. RU) GO TO 120
                  C 301 CONTINUE
                  IU = IU + 1
                  YV(IU) = YS
                  NSB = NSB + 1
                  R = YS

165      C
          NSB = 0
          R = 0.0
          IU = 1
          YV(1) = 0.0
          IY = -1
          DO 120 I = 1,NBOXS
              MBOX = IFB + I - 1
              MBOX = MBOX + IB1
              YS = YZ(MBOX)
              IF (YS.EQ.R) GO TO 120
              DO 301 NU = 1,IU
                  RU = YV(NU)
                  IF (YS.EQ. RU) GO TO 120
                  C 301 CONTINUE
                  IU = IU + 1
                  YV(IU) = YS
                  NSB = NSB + 1
                  R = YS

170      C
          NSB = 0
          R = 0.0
          IU = 1
          YV(1) = 0.0
          IY = -1
          DO 120 I = 1,NBOXS
              MBOX = IFB + I - 1
              MBOX = MBOX + IB1
              YS = YZ(MBOX)
              IF (YS.EQ.R) GO TO 120
              DO 301 NU = 1,IU
                  RU = YV(NU)
                  IF (YS.EQ. RU) GO TO 120
                  C 301 CONTINUE
                  IU = IU + 1
                  YV(IU) = YS
                  NSB = NSB + 1
                  R = YS

```

C IS THIS R SIGNIFICANTLY DIFFERENT FROM THE LAST ?

```

IYL = IY
IY = 60.* (R - YL) / SCALE
IF (KLU.EQ.KLU) IY = 60.* (YU-R) / SCALE
IF (IY.EQ.IYL) GO TO 120

C CLEAR THE PRINT RECORD
C DO 5 J = 1,37
180   C      5 FMT(J) = BLANK(J)

C SEARCH ALL PANELS, SELECTING THOSE WHERE Y=R. THESE BECOME THE
C BOXES TO BE PLOTTED CHORDWISE. NFB COUNTS THESE.
C
185   C NFB = 0
      IX = -1
      DO 8 II = 1,NBODXS
         J = 1FB + II - 1
         J = J + IB1
         IF (YZ(J) .NE. R) GO TO 8
C DIGITIZE DEFLECTIONS AND COORDINATES TO FIT PAGE
C
190   C IXL = IX
      IX = 33.* (X(J) - XL) / SCALE
      IF (IX.EQ.IXL) GO TO 8
      FMT(IX+4) = WORD
35    NFB = NFB + 1
      IPRINT(NFB) = 100.*DEF(II)
      8 CONTINUE
C PRINTOUT
C
195   C IYDIF = IY - IYL - 1
      IF (IYDIF.LT.1) GO TO 9
      DO 7 J = 1,IYDIF
9       WRITE (ITAPEW,701)
7        FORMAT (1H )
      701 FORMAT (1H )
      9 CONTINUE
      WRITE (ITAPEW,FMT) R, (IPRINT(J), J= 1,NFB)
      120 CONTINUE
      COUNT = LINES
C
200   C
C FORMATS
C
205   C
1000 FORMAT ( 32HMODAL DEFLECTIONS      TIMES 1.OE.13,10H, SURFACE=
1100 FORMAT ( 32HMODAL SLOPES (RAD/FT) TIMES 1.OE.13,10H, SURFACE=
2000 FORMAT (10X,32HMODAL DEFLECTIONS      TIMES 1.OE.13,11H, SURFACE =
1           12, 8H, MODE = 13, 14X)      MODE = 13, 14X)
2100 FORMAT (10X,32HMODAL SLOPES (RAD/FT) TIMES 1.OE.13,11H, SURFACE =
1           12, 8H, MODE = 13, /, 10X,58(1H-)      MODE = 13, /, 10X,58(1H-)
C1BM
C3000 FORMAT (18A4)
C1BM
215   C

```

SUBROUTINE MOVIS      74 / 74      OPT = 1

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3000 FORMAT (7A10,1A2)  
CCDC  
4000 FORMAT (10X,46  
1 HGRAPHICAL REPP  
C RETURN  
END

MOVIS	230
MOVIS	231
MOVIS	232
MOVIS	233
MOVIS	234
MOVIS	235
MOVIS	236

CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM	AN IF STATEMENT MAY BE
103	I			

SYMBOLIC REFERENCE MAP (R=3)

VARIABLES	SN	TYPE	RELOCATION
660 IJ		INTEGER	
671 IX		INTEGER	
673 IXL		INTEGER	
661 IY		INTEGER	
674 IYDIF		INTEGER	
666 IYL		INTEGER	
667 J		INTEGER	
7 KBPAGE		INTEGER	
4 KLABEL		INTEGER	
446 KLU		INTEGER	
0 KLUE		INTEGER	
0 KOUNT		INTEGER	
11 KOUNTH		INTEGER	
12 KOUNTI		INTEGER	
1 KPAGE		INTEGER	
0 KTABLE		INTEGER	
5 KTABLO		INTEGER	
5 KTPAGE		INTEGER	
2 LINES		INTEGER	
10 LINESG		INTEGER	
3 LINEST		INTEGER	
662 MBOX		INTEGER	
0 NBOXS		INTEGER	
3 NCOLS		INTEGER	
4 NCOLST		INTEGER	
670 NFBB		INTEGER	
6 NPAGE		INTEGER	
6 NPAGEA		INTEGER	
1 NPASS		INTEGER	
2 NROWS		INTEGER	
656 NSB		INTEGER	
664 NU		INTEGER	
657 R		REAL	
665 RU		REAL	
655 SCALE		REAL	
653 SPAN		REAL	
651 SY		REAL	
652 SZ		REAL	
652 SZ		TITLE	
675 WORD		REAL	
0 X		REAL	
0 XI		REAL	
636 XL		REAL	
632 XU		REAL	
643 X1		REAL	
620 Y		REAL	
637 YL		REAL	
663 YS		REAL	
633 YU		REAL	
705 YV		REAL	
620 YZ		REAL	
644 Y1		REAL	
123			
REFS	124	125	
REFS	161	165	
REFS	194	196	
REFS	196	197	
REFS	172	175	
REFS	205	206	
REFS	175	204	
REFS	2*180	189	
REFS	179	188	
REFS	25	25	
REFS	174	DEFINED	
REFS	174	DEFINED	
REFS	25	2	
REFS	50	114	
REFS	25	25	
REFS	25	25	
REFS	27	27	
REFS	27	27	
REFS	25	25	
REFS	25	25	
REFS	25	25	
REFS	158	159	
REFS	20	55	
REFS	25	27	
REFS	20	55	
REFS	27	27	
REFS	198	199	
REFS	25	27	
REFS	27	27	
REFS	167	DEFINED	
REFS	162	DEFINED	
REFS	160	173	
REFS	152	168	
REFS	163	DEFINED	
REFS	173	174	
REFS	148	149	
REFS	143	145	
REFS	145	146	
REFS	15	118	
REFS	197	DEFINED	
REFS	18	58	
REFS	20	67	
REFS	72	140	
REFS	62	76	
REFS	2*72	2*76	
REFS	18	30	
REFS	73	141	
REFS	160	163	
REFS	63	77	
REFS	20	162	
REFS	22	30	
REFS	2*73	2*77	
REFS	124	125	
REFS	161	165	
REFS	194	197	
REFS	172	204	
REFS	205	206	
REFS	175	204	
REFS	175	204	
REFS	190	195	
REFS	189	206	
REFS	25	25	
REFS	174	DEFINED	
REFS	174	DEFINED	
REFS	25	2	
REFS	114	114	
REFS	130	212	
REFS	25	25	
REFS	27	27	
REFS	114	117	
REFS	130	210	
REFS	25	25	
REFS	27	27	
REFS	37	50	
REFS	25	25	
REFS	159	159	
REFS	20	55	
REFS	25	27	
REFS	157	157	
REFS	156	156	
REFS	158	158	
REFS	187	187	
REFS	116	116	
REFS	198	198	
REFS	210	210	
REFS	46	46	
REFS	199	199	
REFS	25	27	
REFS	27	27	
REFS	45	45	
REFS	151	151	
REFS	167	167	
REFS	161	161	
REFS	173	174	
REFS	190	190	
REFS	162	163	
REFS	174	175	
REFS	195	195	
REFS	143	143	
REFS	147	147	
REFS	142	142	
REFS	109	109	
REFS	162	162	
REFS	174	175	
REFS	195	195	
REFS	148	148	
REFS	147	147	
REFS	141	141	
REFS	125	125	
REFS	146	146	
REFS	147	147	
REFS	142	142	
REFS	58	58	
REFS	68	68	
REFS	59	59	
REFS	69	69	
REFS	63	63	
REFS	72	72	
REFS	58	58	
REFS	62	62	
REFS	68	68	
REFS	76	76	
REFS	76	76	
REFS	140	140	
REFS	100	100	
REFS	195	195	
REFS	173	173	
REFS	134	134	
REFS	118	118	
REFS	146	146	
REFS	145	145	
REFS	143	143	
REFS	149	149	
REFS	174	174	
REFS	195	195	
REFS	143	143	
REFS	147	147	
REFS	142	142	
REFS	109	109	
REFS	149	149	
REFS	147	147	
REFS	141	141	
REFS	174	174	
REFS	166	166	
REFS	168	168	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	59	59	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	
REFS	159	159	
REFS	77	77	
REFS	166	166	
REFS	154	154	
REFS	190	190	
REFS	69	69	
REFS	73	73	
REFS	141	141	
REFS	173	173	
REFS	163	163	
REFS	77	77	
REFS	141	141	
REFS	174	174	
REFS	162	162	
REFS	154	154	
REFS	166	166	

SUBROUTINE MOVIS		74/74	OPT=1		FTN 4 8+577	85/01/23 . 08 10.44	PAGE
VARIABLES	SN TYPE	RELOCATION		REFS	74	142	74
640 ZL	REAL			REFS	64	78	78
634 ZU	REAL			REFS	18	60	60
1440 ZZ	REAL	ARRAY	MODV	REFS	2*74	2*78	70
645 Z <sup>1</sup>	REAL			REFS			
VARIABLES USED AS FILE NAMES, SEE ABOVE				REFS			
EXTERNALS	TYPE	ARGS	REFERENCES				
PLB		3	41				
PTABLE		3	48				
TITLES		1	40				
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES			
ABS	REAL	1	INTRIN	83			
STATEMENT LABELS		DEF LINE	REFERENCES				
O 1		79	65				
136 2		94	86				
146 3		99	87				
O 4		92	88				
O 5		180	179				
O 6		98	94				
O 7		207	206				
372 8		200	187				
406 9		209	205				
O 10		100	99				
O 35		198					
37 100		51	39				
413 120		211	156				
O 301		164	161				
167 400		105	103				
217 500		121	103				
246 600		136	103				
523 701	FMT	208	207				
532 1000	FMT	2117	107				
543 1100	FMT	2119	123				
554 2000	FMT	221	112				
566 2100	FMT	223	128				
600 3000	FMT	229	109				
602 4000	FMT	231	42				
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
57 1	I	65 79	358	OPT			
127 4	I	88 92	7B	INSTACK	EXITS		
137 6	I	94 98	7B	INSTACK	EXITS		
147 10	I	99 100	6B		EXT REFS		
301 120	I	156 211	115B		EXT REFS	NOT INNER	
310 301	NU	161 164	6B	INSTACK	EXITS		
341 5	J	179 180	3B	INSTACK	OPT		
355 8	I	187 200	16B				
401 7	J	206 207	5B				
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
MODV	120C	O X	(400)		400 Y	(400)	
CTAPES	50	O ITAPES	(50)				
COMRWP	3	O ITAPER	(1)		1 ITAPEW	(1)	
CLIST	11	O KOUNT	(1)		1 KPAGE	(1)	
		2 ITAPER	(1)		2 LINES	(1)	
		2 ITAPER	(1)		2 KPAGE	(1)	
		2 ITAPER	(1)		2 KPAGE	(1)	

SUBROUTINE PICTUR 74/74 OPT=1

FIN 4 .8+577

PAGE

2

```

DO 360 I=2,NHTIC          PICTUR 59
  HLAB(I)=HLAB(I-1)+HEXTRA/HSCL   PICTUR 60
  WRITE (ITAPEW,800) BCDH,HSCL    PICTUR 61
  WRITE (ITAPEW,810)(HLAB(LL),LL=1,NHTIC)
DO 700 I=1,140               PICTUR 62
  B(1)=BLANK
DO 710 I=1,NCELL,10          PICTUR 63
  B(I)=DOT
  WRITE (ITAPEW,841)(B(I),I=1,NCELL) PICTUR 64
C   WRITE (ITAPEW,841) (B(I), I=1,NCELL)
  VNOW=VORG- 5*VPERL           PICTUR 65
  VLABT=VORG- 5*VPERL         PICTUR 66
  HORG=HORG- 5*HPERC         PICTUR 67
  K=1
  DO 1000 I=1,NLINE          PICTUR 68
    IVLAB=0
    NPOINT=0
    VNEXT=VNOW+VPERL
    IF (MOD(I-1,10).EQ.0) IVLAB=3
 1010 J=ITRANS(K)             PICTUR 69
    IF (INV GE.0) GO TO 1020
    GO TO 1120
 1020 IF (VVAL(J).GE.VNOW) GO TO 1040
    GO TO 1030
 1120 IF (VNOW.GE.VVAL(J)) GO TO 1140
    GO TO 1030
 1030 IF (K.GE.NDATA) GO TO 1300
    K=K+1
    GO TO 1010
 1040 IF (VNEXT.GE.VVAL(J)) GO TO 1050
    GO TO 1300
 1140 IF (VVAL(J).GE.VNEXT) GO TO 1050
    GO TO 1300
 1050 NPOINT=NPOINT+1
    IF (NPOINT.GE.100) GO TO 1300
    VTEMP(NPOINT)=VVAL(J)
    HTEMP(NPOINT)=HVAL(J)
    JSAVE(NPOINT)=J
    GO TO 1030
 1300 IF (NPOINT.LE.1) GO TO 1319
    NPT=NPOINT*NH
    CALL AORDER(HTEMP,NPT,IP,1)
    JJ=IP(1)
    JJ=IP(NPOINT)
    GO TO 1320
 1319 IP(1)=1
 1320 DO 1330 II=1,140
    1330 B(II)=BLANK
    IF (I-10)1400,1400,1410
 1410 IF (I-23)1420,1400,1400
 1420 ISYM=I-10
    ASYM=BCDV(ISYM)
    GO TO 1430
 1400 ASYM=BLANK
 1430 CONTINUE
    IF (IVLAB)1340,1340,1350
 1350 DO 1351 II=1,140,2

```

```

      PICTUR 71
      PICTUR 72
      PICTUR 73
      PICTUR 74
      PICTUR 75
      PICTUR 76
      PICTUR 77
      PICTUR 78
      PICTUR 79
      PICTUR 80
      PICTUR 81
      PICTUR 82
      PICTUR 83
      PICTUR 84
      PICTUR 85
      PICTUR 86
      PICTUR 87
      PICTUR 88
      PICTUR 89
      PICTUR 90
      PICTUR 91
      PICTUR 92
      PICTUR 93
      PICTUR 94
      PICTUR 95
      PICTUR 96
      PICTUR 97
      PICTUR 98
      PICTUR 99
      PICTUR 100
      PICTUR 101
      PICTUR 102
      PICTUR 103
      PICTUR 104
      PICTUR 105
      PICTUR 106
      PICTUR 107
      PICTUR 108
      PICTUR 109
      PICTUR 110
      PICTUR 111
      PICTUR 112
      PICTUR 113
      PICTUR 114
      PICTUR 115

```

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1      SUBROUTINE PICTUR (VVAL,NVAL,NDATA,BCDV,BCDH,XCELL ,HON ,HTW ,XLIN PICTUR
1E .VON,VTW,NPTS,NORD,ITRANS )                                         2
2
3
4
5      C      DIMENSION VVAL(1) : HVAL(1) : BCDV(1)
5      C      DIMENSION BCDH(12) : NPTS(1) : ITRANS(1)                           3
5      C      DIMENSION PLTS(40) : HLAB(40) : PI_TUR
5      C      DIMENSION B(150) : HTEMP(100) : PICTUR
5      C      DIMENSION VTEMP(100) : JSAVE(100) : PICTUR
5      C      DIMENSION MPTS(40) : BCDS(40) : PICTUR
5      C      DIMENSION ITAPES(50) : PICTUR
10     C      COMMON / CTAPES / ITAPES                                         4
10     C
10     C      DATA BLANK /1H / , DOT /1H / , ASTRIC /1H*/,
10     C      DATA BCDS/1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9,1HA,
10     C      1   1HB,1HC,1HD,1HE,1HF,1HG,1HH,1HI,1HJ,1HK,          5
10     C      2   1HL,1HM,1HN,1HO,1HP,1HQ,1HR,1HS,1HT,1HU,          6
10     C      3   1HV,1HW,1HX,1HY,1HZ,1H+,1H-,1H$,1H&,1H%/,          7
10     C      ITAPEW = ITAPES(6)                                              8
10     C      HONE=HON
10     C      HTWO=HTW
10     C      VONE=VON
10     C      VTWO=VTW
10     C      NV=1
10     C      NH=1
10     C      MID = 40
10     C      DO 1 I=1,MID
10     C      1 MPTS(1)=NPTS(1)
10     C      DO 5 I=2,MID
10     C      5 MPTS(I)=MPTS(I)+MPTS(I-1)
10     C      DO 8 I=1,MID
10     C      8 PLTS(I)=BCDS(I)
10     C      9 CONTINUE
10     C      IF (VONE.GT.VTWO)NV=-1
10     C      IF (HONE.GT.HTWO)NH=-1
10     C      IF (NORD.NE.1) GO TO 10
10     C      NDAT=NVANDATA
10     C      CALL AORDER(VVAL,NDAT,ITRANS,1)
10     C      CONTINUE
10     C      XCON=SIGN(1.,XLINE )
10     C      XLINES = ABS(XLINE)
10     C      CALL SCIMAX(VVAL,NDATA,IVSCL,VONE,VTWO,XCON,NV)           9
10     C      CALL SCILNC(VONE,VTWO,XLINES,VEXTRA,VORG,O)
10     C      XCON=SIGN(1.,XCELL )
10     C      XCELLS = ABS(XCELL)
10     C      CALL SCIMAX(HVAL,NDATA,IHSCL,HONE,HTWO,XCON,NH)           10
10     C      CALL SCILNC(HONE,HTWO,XCELLS,HEXTRA,HORG,O)
10     C      NHTIC= 1*(XCELLS+1.)+1.
10     C      HSCL10,**IHSCL
10     C      VSCL = 10.**IVSCL
10     C      HPERC=HEXTRA/10.
10     C      VPERL=VEXTRA/5.
10     C      NCCELL=XCEL S+1.
10     C      NLINEx=XLINES+1.
10     C      HIAB(1)=HORG/HSCL

```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	5	I	25 27	13B	NOT INNER
20	5	J	26 27	2B	INSTACK
26	250	LL	28 120	277B	NOT INNER
71	20	I	47 49	6B	INSTACK
137	200	K	68 116	151B	NOT INNER EXITS
146	90	J	71 74	6B	INSTACK
170	120	J	81 84	6B	INSTACK
213	145	J	90 93	13B	OPT
271	195	J	109 113	10B	OPT
COMMON BLOCKS	CHSP	LENGTH 1	MEMBERS - BIAS NAME(LENGTH) 0 KDEG (1)		

## STATISTICS

PROGRAM LENGTH	431B	281
CM LABELED COMMON LENGTH	1B	1
52000B CM USED		

SUBROUTINE	HELGA	74/74	OPT=1	
VARIABLES	SN	TYPE	RELOCATION	
		F.P.	F.P.	
O OPA	0	INTEGER	REFS	11
333 OPD	333	INTEGER	REFS	11
O DPH	0	INTEGER	REFS	102
345 PROL	345	REAL	REFS	11
346 PROLP	346	REAL	DEFINED	29
O X	0	REAL	REFS	52
	X	REAL	REFS	55
		ARRAY	REFS	41
		F.P.	REFS	75
			REFS	85
			DEFINED	99
			DEFINED	101
			DEFINED	2*103
			DEFINED	1
INLINE FUNCTIONS	MINO	TYPE	ARGS	FTN 4.8+577
		INTEGER	O INTRIN	85/01/23.
STATEMENT LABELS			DEF LINE	08.10.44
0 5	0		DEF LINE	PAGE 4
63 10	63		REFS	
0 15	0	INACTIVE	27	39
0 20	0	INACTIVE	44	35
101 25	101	INACTIVE	47	42
0 30	0	INACTIVE	49	
106 40	106	INACTIVE	52	
0 45	0	INACTIVE	53	
115 55	115	INACTIVE	56	
120 60	120	INACTIVE	57	
122 65	122	INACTIVE	59	
127 70	127	INACTIVE	62	
134 75	134	INACTIVE	64	
0 80	0	INACTIVE	66	
153 90	153	INACTIVE	67	
0 95	0	INACTIVE	69	
0 100	0	INACTIVE	70	
164 110	164	INACTIVE	73	
0 115	0	INACTIVE	74	
175 120	175	INACTIVE	76	
200 125	200	INACTIVE	77	
206 135	206	INACTIVE	80	
0 140	0	INACTIVE	83	
225 145	225	INACTIVE	84	
0 150	0	INACTIVE	86	
232 155	232	INACTIVE	89	
233 160	233	INACTIVE	92	
0 165	0	INACTIVE	93	
250 170	250	INACTIVE	95	
257 175	257	INACTIVE	97	
260 180	260	INACTIVE	98	
0 185	0	INACTIVE	101	
300 195	300	INACTIVE	103	
305 200	305	INACTIVE	104	
322 250	322	INACTIVE	106	
54 300	54	INACTIVE	107	
310 350	310	INACTIVE	109	

VARIABLES	SN	TYPE	RELOCATION	
		F.P.	F.P.	
O OPA	0	INTEGER	REFS	29
333 OPD	333	INTEGER	REFS	31
O DPH	0	INTEGER	REFS	52
345 PROL	345	REAL	REFS	55
346 PROLP	346	REAL	DEFINED	41
O X	0	REAL	REFS	75
	X	REAL	REFS	83
		ARRAY	REFS	86
		F.P.	REFS	103
			REFS	101
			DEFINED	99
			DEFINED	110
			DEFINED	80
			DEFINED	83
			DEFINED	95
			DEFINED	2*38
			DEFINED	46
			DEFINED	48
			DEFINED	2*112
			DEFINED	2*111
			DEFINED	2*118



SUBROUTINE HELGA    74/74    OPT=1

FTN 4.8+577    85/01/23. OB . 10. 44    PAGE 2

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      GOTO 350
  55 INC=1
      K=1
      GO TO 70
  60 LS=1
      GO TO 75
  65 K=I
      IF(K>K.LE.NX+1) K=K-1
  70 LS=K-((K-1)*(N+1))/NX
  75 M=LS+N
      DO 200 K=LS,M
      IF(INC) 180,80,180
  80 PROL=1. DO
      DO 90 J=LS,M
      IF(K-J)85,90,85
      PROL=(ARG-X(J))*(PROL/(X(K)-X(J)))
  85 CONTINUE
  90 IF(OPH)135,95,135
  95 IF(OPD)110,100,100
 100 ANS(LL,1) = PROL * F(K,1) + ANS(LL,1)
C
      IF(OPD)110,200,110
  80 PROLP=0.
      DO 120 J=LS,M
      IF(K-J)115,120,115
  115 PROLP=PROL/(ARG-X(J))+PROLP
 120 CONTINUE
      IF(OPH)160,125,160
 125 ANS(LL,DA) = PROLP * F(K,1) + ANS(LL,DA)
C
      GO TO 200
 135 HERLP=0.
  90 DO 145 J=LS,M
      IF(K-J)140,145,140
 140 HERLP=1. DO/(X(K)-X(J))+HERLP
 145 CONTINUE
      IF(INC)150,155,150
 150 PROLP=HERLP
      GO TO 125
 155 IF(OPD)110,160,110
 160 A = F(K,2) - 2.0 * HERLP * F(K,1)
      B =(F(K,1) + A * (ARG - X(K))) * PROL
 165 IF(OPD)170,165,165
 166 ANS(LL,1) = PROL * B + ANS(LL,1)
 170 IF(OPD)170,175,170
 171 ANS(LL,DA) = 2.0 * PROLP * B + A * PROL * PROL + ANS(LL,DA)
 175 CONTINUE
      GO TO 200
 180 IF(K-1)185,135,185
 185 A=1. DO
      B=1. DO
 190 DO 195 J=LS,M
      IF(J.EQ.K)GO TO 195
      B=(X(K)-X(J))*B
      IF(J.NE.I)A=(X(I)-X(J))*A
 195 CONTINUE
      PROLP=A/B

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SUBROUTINE HELGA 74/74 OPT=1 FTN 4.8+577 85/01/23 08.10.44 PAGE 1  
 1 C SUBROUTINE HELGA (ARC,ANS,NF,NDF,X,F,NX,L,NDX,OPH,OPA) HELGA  
 C COMMON /CHSP/ KDEG HELGA  
 C DIMENSION ANS(NDF,1) X(1) HELGA  
 C DIMENSION F(NDX,1) : ARC(1) HELGA  
 5 C BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS HELGA  
 C DOUBLE PRECISION PROL,PROL,HERLP,A,B HELGA  
 CIBM ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS HELGA  
 C  
 C INTEGER DA , OPH , OPD , OPA HELGA  
 C REVISED ROUTINE FOR ONE SET OF FUNCTIONS AND MULTIPLE ARGUMENTS HELGA  
 C ARC ARGUMENTS HELGA  
 C ANS DBL. DIM. ARRAY OF INTERPOLATION RESULTS HELGA  
 C NF NO. OF ARGUMENTS HELGA  
 C NDF DIMENSION FOR ARGUMENTS HELGA  
 C X ARRAY OF ARGUMENTS OF TABLES HELGA  
 C F DBL. DIM. ARRAY OF GIVEN FUNCTION VALUES HELGA  
 C NX NO. OF VALUES IN TABLE HELGA  
 C L MAX. NO. VALUES USED FOR INTERPOLATION HELGA  
 C NDX DIMENSION FOR TABLE HELGA  
 C OPH = 0 LAGRANGE = 1 HERMITE HELGA  
 C OPD = -1 DERIVATIVE = 0 FUNCTION = 1 BOTH HELGA  
 C  
 10 C DO 5 I=1,2 HELGA  
 C DO 5 J=1,NF HELGA  
 5 ANS(J,I)=0. HELGA  
 C DO 250 LL = 1,NF HELGA  
 C OPD = QPA HELGA  
 C DA = 1 HELGA  
 C IF (OPD.EQ.1) DA=2 HELGA  
 C ARG = ARC(LL) HELGA  
 C N = L - 1 HELGA  
 15 C IF (KDEG.GT.1) GO TO 10 HELGA  
 C IF ( ARG .GE. X(1) .AND. ARG .LE. X(NX) ) GO TO 10 HELGA  
 C IF ( KDEG .EQ. 1 ) GO TO 300 HELGA  
 C IF ( KDEG .EQ. 1 ) GO TO 300 HELGA  
 C IF ( ARG .GT. X(NX) ) ARG=X(NX) HELGA  
 C IF ( ARG .LT. X(1) ) ARG=X(1) HELGA  
 C IF (OPA.LT.0) GOTO 10 HELGA  
 C DA = 2 HELGA  
 C OPD = 1 HELGA  
 C  
 20 C DO 5 I=1,2 HELGA  
 C DO 5 J=1,NF HELGA  
 5 ANS(J,I)=0. HELGA  
 C DO 250 LL = 1,NF HELGA  
 C OPD = QPA HELGA  
 C DA = 1 HELGA  
 C IF (OPD.EQ.1) DA=2 HELGA  
 C ARG = ARC(LL) HELGA  
 C N = L - 1 HELGA  
 25 C IF (KDEG.GT.1) GO TO 10 HELGA  
 C IF ( ARG .GE. X(1) .AND. ARG .LE. X(NX) ) GO TO 10 HELGA  
 C IF ( KDEG .EQ. 1 ) GO TO 300 HELGA  
 C IF ( ARG .GT. X(NX) ) ARG=X(NX) HELGA  
 C IF ( ARG .LT. X(1) ) ARG=X(1) HELGA  
 C IF (OPA.LT.0) GOTO 10 HELGA  
 C DA = 2 HELGA  
 C OPD = 1 HELGA  
 C  
 30 C DO 5 I=1,2 HELGA  
 C DO 5 J=1,NF HELGA  
 5 ANS(J,I)=0. HELGA  
 C DO 250 LL = 1,NF HELGA  
 C OPD = QPA HELGA  
 C DA = 1 HELGA  
 C IF (OPD.EQ.1) DA=2 HELGA  
 C ARG = ARC(LL) HELGA  
 C N = L - 1 HELGA  
 35 C IF (KDEG.GT.1) GO TO 10 HELGA  
 C IF ( ARG .GE. X(1) .AND. ARG .LE. X(NX) ) GO TO 10 HELGA  
 C IF ( KDEG .EQ. 1 ) GO TO 300 HELGA  
 C IF ( ARG .GT. X(NX) ) ARG=X(NX) HELGA  
 C IF ( ARG .LT. X(1) ) ARG=X(1) HELGA  
 C IF (OPA.LT.0) GOTO 10 HELGA  
 C DA = 2 HELGA  
 C OPD = 1 HELGA  
 C  
 40 C DO 5 I=1,2 HELGA  
 C DO 5 J=1,NF HELGA  
 5 ANS(J,I)=0. HELGA  
 C DO 250 LL = 1,NF HELGA  
 C OPD = QPA HELGA  
 C DA = 1 HELGA  
 C IF (OPD.EQ.1) DA=2 HELGA  
 C ARG = ARC(LL) HELGA  
 C N = L - 1 HELGA  
 45 C IF (KDEG.GT.1) GO TO 10 HELGA  
 C IF ( ARG .GE. X(1) )60.25,15 HELGA  
 C IF ( ARG .LT. X(1) )65.25,20 HELGA  
 C 15 DO 20 I=2,NX HELGA  
 C IF ( ARG .X(I) )65.25,20 HELGA  
 C 20 CONTINUE HELGA  
 C LS=NX-N HELGA  
 C  
 50 C DO 5 I=1,2 HELGA  
 C DO 5 J=1,NF HELGA  
 5 ANS(J,I)=0. HELGA  
 C DO 250 LL = 1,NF HELGA  
 C OPD = QPA HELGA  
 C DA = 1 HELGA  
 C IF (OPD.EQ.1) DA=2 HELGA  
 C ARG = ARC(LL) HELGA  
 C N = L - 1 HELGA  
 55 C IF (KDEG.GT.1) GO TO 10 HELGA  
 C IF ( ARG .GE. X(1) )40.30,30 HELGA  
 C 25 IF (OPD)40.30,30 HELGA  
 C 30 ANS(LL,1) = F(I,1) HELGA  
 C  
 C 40 IF (OPH)40.250,40 HELGA  
 C 45 IF (OPH)45.55,45 HELGA  
 C 50 IF (OPH)50.60,50 HELGA  
 C 55 IF (OPH)55.65,55 HELGA  
 C 57 IF (OPH)57.70,57 HELGA  
 C 60 IF (OPH)60.75,75 HELGA  
 C 65 IF (OPH)65.80,80 HELGA  
 C 70 IF (OPH)70.85,85 HELGA  
 C 75 IF (OPH)75.90,90 HELGA  
 C 80 IF (OPH)80.95,95 HELGA  
 C 85 IF (OPH)85.100,100 HELGA  
 C 90 IF (OPH)90.105,105 HELGA  
 C 95 IF (OPH)95.110,110 HELGA  
 C 100 IF (OPH)100.115,115 HELGA  
 C 105 IF (OPH)105.120,120 HELGA  
 C 110 IF (OPH)110.125,125 HELGA  
 C 115 IF (OPH)115.130,130 HELGA  
 C 120 IF (OPH)120.135,135 HELGA  
 C 125 IF (OPH)125.140,140 HELGA  
 C 130 IF (OPH)130.145,145 HELGA  
 C 135 IF (OPH)135.150,150 HELGA  
 C 140 IF (OPH)140.155,155 HELGA  
 C 145 IF (OPH)145.160,160 HELGA  
 C 150 IF (OPH)150.165,165 HELGA  
 C 155 IF (OPH)155.170,170 HELGA  
 C 160 IF (OPH)160.175,175 HELGA  
 C 165 IF (OPH)165.180,180 HELGA  
 C 170 IF (OPH)170.185,185 HELGA  
 C 175 IF (OPH)175.190,190 HELGA  
 C 180 IF (OPH)180.195,195 HELGA  
 C 185 IF (OPH)185.200,200 HELGA  
 C 190 IF (OPH)190.205,205 HELGA  
 C 195 IF (OPH)195.210,210 HELGA  
 C 200 IF (OPH)200.215,215 HELGA  
 C 205 IF (OPH)205.220,220 HELGA  
 C 210 IF (OPH)210.225,225 HELGA  
 C 215 IF (OPH)215.230,230 HELGA  
 C 220 IF (OPH)220.235,235 HELGA  
 C 225 IF (OPH)225.240,240 HELGA  
 C 230 IF (OPH)230.245,245 HELGA  
 C 235 IF (OPH)235.250,250 HELGA  
 C 240 IF (OPH)240.255,255 HELGA  
 C 245 IF (OPH)245.260,260 HELGA  
 C 250 IF (OPH)250.265,265 HELGA  
 C 255 IF (OPH)255.270,270 HELGA  
 C 260 IF (OPH)260.275,275 HELGA  
 C 265 IF (OPH)265.280,280 HELGA  
 C 270 IF (OPH)270.285,285 HELGA  
 C 275 IF (OPH)275.290,290 HELGA  
 C 280 IF (OPH)280.295,295 HELGA  
 C 285 IF (OPH)285.300,300 HELGA  
 C 290 IF (OPH)290.305,305 HELGA  
 C 295 IF (OPH)295.310,310 HELGA  
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 C 430 IF (OPH)430.445,445 HELGA  
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 C 455 IF (OPH)455.470,470 HELGA  
 C 460 IF (OPH)460.475,475 HELGA  
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 C 480 IF (OPH)480.495,495 HELGA  
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 C 490 IF (OPH)490.505,505 HELGA  
 C 495 IF (OPH)495.510,510 HELGA  
 C 500 IF (OPH)500.515,515 HELGA  
 C 505 IF (OPH)505.520,520 HELGA  
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 C 980 IF (OPH)980.995,995 HELGA  
 C 985 IF (OPH)985.1000,1000 HELGA  
 C 990 IF (OPH)990.1005,1005 HELGA  
 C 995 IF (OPH)995.1010,1010 HELGA  
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 C 1005 IF (OPH)1005.1020,1020 HELGA  
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 C 1030 IF (OPH)1030.1045,1045 HELGA  
 C 1035 IF (OPH)1035.1050,1050 HELGA  
 C 1040 IF (OPH)1040.1055,1055 HELGA  
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 C 1050 IF (OPH)1050.1065,1065 HELGA  
 C 1055 IF (OPH)1055.1070,1070 HELGA  
 C 1060 IF (OPH)1060.1075,1075 HELGA  
 C 1065 IF (OPH)1065.1080,1080 HELGA  
 C 1070 IF (OPH)1070.1085,1085 HELGA  
 C 1075 IF (OPH)1075.1090,1090 HELGA  
 C 1080 IF (OPH)1080.1095,1095 HELGA  
 C 1085 IF (OPH)1085.1100,1100 HELGA  
 C 1090 IF (OPH)1090.1105,1105 HELGA  
 C 1095 IF (OPH)1095.1110,1110 HELGA  
 C 1100 IF (OPH)1100.1115,1115 HELGA  
 C 1105 IF (OPH)1105.1120,1120 HELGA  
 C 1110 IF (OPH)1110.1125,1125 HELGA  
 C 1115 IF (OPH)1115.1130,1130 HELGA  
 C 1120 IF (OPH)1120.1135,1135 HELGA  
 C 1125 IF (OPH)1125.1140,1140 HELGA  
 C 1130 IF (OPH)1130.1145,1145 HELGA  
 C 1135 IF (OPH)1135.1150,1150 HELGA  
 C 1140 IF (OPH)1140.1155,1155 HELGA  
 C 1145 IF (OPH)1145.1160,1160 HELGA  
 C 1150 IF (OPH)1150.1165,1165 HELGA  
 C 1155 IF (OPH)1155.1170,1170 HELGA  
 C 1160 IF (OPH)1160.1175,1175 HELGA  
 C 1165 IF (OPH)1165.1180,1180 HELGA  
 C 1170 IF (OPH)1170.1185,1185 HELGA  
 C 1175 IF (OPH)1175.1190,1190 HELGA  
 C 1180 IF (OPH)1180.1195,1195 HELGA  
 C 1185 IF (OPH)1185.1200,1200 HELGA  
 C 1190 IF (OPH)1190.1205,1205 HELGA  
 C 1195 IF (OPH)1195.1210,1210 HELGA  
 C 1200 IF (OPH)1200.1215,1215 HELGA  
 C 1205 IF (OPH)1205.1220,1220 HELGA  
 C 1210 IF (OPH)1210.1225,1225 HELGA  
 C 1215 IF (OPH)1215.1230,1230 HELGA  
 C 1220 IF (OPH)1220.1235,1235 HELGA  
 C 1225 IF (OPH)1225.1240,1240 HELGA  
 C 1230 IF (OPH)1230.1245,1245 HELGA  
 C 1235 IF (OPH)1235.1250,1250 HELGA  
 C 1240 IF (OPH)1240.1255,1255 HELGA  
 C 1245 IF (OPH)1245.1260,1260 HELGA  
 C 1250 IF (OPH)1250.1265,1265 HELGA  
 C 1255 IF (OPH)1255.1270,1270 HELGA  
 C 1260 IF (OPH)1260.1275,1275 HELGA  
 C 1265 IF (OPH)1265.1280,1280 HELGA  
 C 1270 IF (OPH)1270.1285,1285 HELGA  
 C 1275 IF (OPH)1275.1290,1290 HELGA  
 C 1280 IF (OPH)1280.1295,1295 HELGA  
 C 1285 IF (OPH)1285.1300,1300 HELGA  
 C 1290 IF (OPH)1290.1305,1305 HELGA  
 C 1295 IF (OPH)1295.1310,1310 HELGA  
 C 1300 IF (OPH)1300.1315,1315 HELGA  
 C 1305 IF (OPH)1305.1320,1320 HELGA  
 C 1310 IF (OPH)1310.1325,1325 HELGA  
 C 1315 IF (OPH)1315.1330,1330 HELGA  
 C 1320 IF (OPH)1320.1335,1335 HELGA  
 C 1325 IF (OPH)1325.1340,1340 HELGA  
 C 1330 IF (OPH)1330.1345,1345 HELGA  
 C 1335 IF (OPH)1335.1350,1350 HELGA  
 C 1340 IF (OPH)1340.1355,1355 HELGA  
 C 1345 IF (OPH)1345.1360,1360 HELGA  
 C 1350 IF (OPH)1350.1365,1365 HELGA  
 C 1355 IF (OPH)1355.1370,1370 HELGA  
 C 1360 IF (OPH)1360.1375,1375 HELGA  
 C 1365 IF (OPH)1365.1380,1380 HELGA  
 C 1370 IF (OPH)1370.1385,1385 HELGA  
 C 1375 IF (OPH)1375.1390,1390 HELGA  
 C 1380 IF (OPH)1380.1395,1395 HELGA  
 C 1385 IF (OPH)1385.1400,1400 HELGA  
 C 1390 IF (OPH)1390.1405,1405 HELGA  
 C 1395 IF (OPH)1395.1410,1410 HELGA  
 C 1400 IF (OPH)1400.1415,1415 HELGA  
 C 1405 IF (OPH)1405.1420,1420 HELGA  
 C 1410 IF (OPH)1410.1425,1425 HELGA  
 C 1415 IF (OPH)1415.1430,1430 HELGA  
 C 1420 IF (OPH)1420.1435,1435 HELGA  
 C 1425 IF (OPH)1425.1440,1440 HELGA  
 C 1430 IF (OPH)1430.1445,1445 HELGA  
 C 1435 IF (OPH)1435.1450,1450 HELGA  
 C 1440 IF (OPH)1440.1455,1455 HELGA  
 C 1445 IF (OPH)1445.1460,1460 HELGA  
 C 1450 IF (OPH)1450.1465,1465 HELGA  
 C 1455 IF (OPH)1455.1470,1470 HELGA  
 C 1460 IF (OPH)1460.1475,1475 HELGA  
 C 1465 IF (OPH)1465.1480,1480 HELGA  
 C 1470 IF (OPH)1470.1485,1485 HELGA  
 C 1475 IF (OPH)1475.1490,1490 HELGA  
 C 1480 IF (OPH)1480.1495,1495 HELGA  
 C 1485 IF (OPH)1485.1500,1500 HELGA  
 C 1490 IF (OPH)1490.1505,1505 HELGA  
 C 1495 IF (OPH)1495.1510,1510 HELGA  
 C 1500 IF (OPH)1500.1515,1515 HELGA  
 C 1505 IF (OPH)1505.1520,1520 HELGA  
 C 1510 IF (OPH)1510.1525,1525 HELGA  
 C 1515 IF (OPH)1515.1530,1530 HELGA  
 C 1520 IF (OPH)1520.1535,1535 HELGA  
 C 1525 IF (OPH)1525.1540,1540 HELGA  
 C 1530 IF (OPH)1530.1545,1545 HELGA  
 C 1535 IF (OPH)1535.1550,1550 HELGA  
 C 1540 IF (OPH)1540.1555,1555 HELGA  
 C 1545 IF (OPH)1545.1560,1560 HELGA  
 C 1550 IF (OPH)1550.1565,1565 HELGA  
 C 1555 IF (OPH)1555.1570,1570 HELGA  
 C 1560 IF (OPH)1560.1575,1575 HELGA  
 C 1565 IF (OPH)1565.1580,1580 HELGA  
 C 1570 IF (OPH)1570.1585,1585 HELGA  
 C 1575 IF (OPH)1575.1590,1590 HELGA  
 C 1580 IF (OPH)1580.1595,1595 HELGA  
 C 1585 IF (OPH)1585.1600,1600 HELGA  
 C 1590 IF (OPH)1590.1605,1605 HELGA  
 C 1595 IF (OPH)1595.1610,1610 HELGA  
 C 1600 IF (OPH)1600.1615,1615 HELGA  
 C 1605 IF (OPH)1605.1620,1620 HELGA  
 C 1610 IF (OPH)1610.1625,1625 HELGA  
 C 1615 IF (OPH)1615.1630,1630 HELGA  
 C 1620 IF (OPH)1620.1635,1635 HELGA  
 C 1625 IF (OPH)1625.1640,1640 HELGA  
 C 1630 IF (OPH)1630.1645,1645 HELGA  
 C 1635 IF (OPH)1635.1650,1650 HELGA  
 C 1640 IF (OPH)1640.1655,1655 HELGA  
 C 1645 IF (OPH)1645.1660,1660 HELGA  
 C 1650 IF (OPH)1650.1665,1665 HELGA  
 C 1655 IF (OPH)1655.1670,1670 HELGA  
 C 1660 IF (OPH)1660.1675,1675 HELGA  
 C 1665 IF (OPH)1665.1680,1680 HELGA  
 C 1670 IF (OPH)1670.1685,1685 HELGA  
 C 1675 IF (OPH)1675.1690,1690 HELGA  
 C 1680 IF (OPH)1680.1695,1695 HELGA  
 C 1685 IF (OPH)1685.1700,1700 HELGA  
 C 1690 IF (OPH)1690.1705,1705 HELGA  
 C 1695 IF (OPH)1695.1710,1710 HELGA  
 C 1700 IF (OPH)1700.1715,1715 HELGA  
 C 1705 IF (OPH)1705.1720,1720 HELGA  
 C 1710 IF (OPH)1710.1725,1725 HELGA  
 C 1715 IF (OPH)1715.1730,1730 HELGA  
 C 1720 IF (OPH)1720.1735,1735 HELGA  
 C 1725 IF (OPH)1725.1740,1740 HELGA  
 C 1730 IF (OPH)1730.1745,1745 HELGA  
 C 1735 IF (OPH)1735.1750,1750 HELGA  
 C 1740 IF (OPH)1740.1755,1755 HELGA  
 C 1745 IF (OPH)1745.1760,1760 HELGA  
 C 1750 IF (OPH)1750

## SUBROUTINE FORM

74/74 OPT=1

VARIABLES	SN	TYPE	RELOCATION
O NGPI		INTEGER	F.P.
O NGPTOT		INTEGER	F.P.
63 NLIN		INTEGER	REFS
O NLINES		INTEGER	REFS
O XGP		REAL	REFS
O XTERM1		REAL	REFS
24 XTERM2		REAL	REFS
O YGP		REAL	REFS
50 YTERM1		REAL	REFS
74 YTERM2		REAL	REFS

VARIABLES USED AS FILE NAMES. SEE ABOVE

## STATEMENT LABELS

DEF LINE REFERENCES

0 40	28	17
60 60	33	15
0 80	27	25

## LOOPS LABEL INDEX

DEF LINE REFERENCES

16 40	17	28
43 80	25	27

## COMMON BLOCKS LENGTH

DEF LINE REFERENCES

JUNK	81	34B
------	----	-----

MEMBERS - BIAS NAME(LENGTH)	PROPERTIES	NOT INNER
O XTERM1 (20)	INSTACK	
60 YTERM2 (20)		
O ITAPES (50)		

## STATISTICS

PROGRAM LENGTH

CM LABELED COMMON LENGTH

1008

52000B CM USED

64

131

40 XTERM1 (20)

20 XTERM2 (20)

80 DIST (1)

40 YTERM1 (20)

60 YTERM2 (20)

O ITAPES (50)

## **SYMBOLIC REFERENCE MAP (R=3)**

SUBROUTINE HELGX

74/74 OPT=1

## STATEMENT LABELS

STATEMENT	LABEL	DEF LINE	REFERENCES
150	90	49	46 47
0	95	INACTIVE	51 50
0	100	INACTIVE	52 2*51
0	105	INACTIVE	53 52
170	110	INACTIVE	55 51 2*54
0	115	INACTIVE	58 2*57
201	120	INACTIVE	59 56 57
204	125	INACTIVE	61 60 71 93
0	130	INACTIVE	62 61
221	135	INACTIVE	64 2*50 84
0	140	INACTIVE	67 2*66
233	145	INACTIVE	68 65 66
0	150	INACTIVE	70 2*69
240	155	INACTIVE	72 69
241	160	INACTIVE	73 2*60 72
0	165	INACTIVE	79 2*78
274	170	INACTIVE	81 78 2*80
301	175	INACTIVE	82 74 80
304	180	INACTIVE	84 2*44
0	185	INACTIVE	85 2*84
324	195	INACTIVE	91 87 88
331	200	INACTIVE	94 43 54 63
334	250	INACTIVE	95 27 33 83

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
17	5	I	13 15	13B	NOT INNER
25	5	J	14 15	2B	INSTACK
40	20	I	19 21	6B	INSTACK
61	35	J	25 26	2B	INSTACK
104	50	K	30 32	4B	INSTACK
134	200	K	43 94	200B	NOT INNER
143	90	J	46 49	6B	INSTACK
162	105	J	52 53	4B	INSTACK
174	120	J	56 59	6B	INSTACK
214	130	J	61 62	4B	INSTACK
226	145	J	65 68	6B	INSTACK
262	175	J	74 82	21B	OPT
315	195	J	87 91	10B	OPT

STATISTICS  
PROGRAM LENGTH  
52000B CM USED

423B 275

SUBROUTINE HELGX			74/74	OPT=1		FTN 4.8+577	85/01/23.	08.10.44	PAGE	3	
VARIABLES	SN	TYPE	RELOCATION			REFS	79	81	89	92	DEFINED
361	B	REAL				REFS 89	9	13	32	2*62	2*81
344	DA	INTEGER				REFS DEFINED 11	12				
0	F	REAL	ARRAY	F.P.		REFS DEFINED 8	26	32	53	62	2*76
357	HERLP	REAL				REFS 2*90	67	70	76	DEFINED	64
346	I	INTEGER				REFS DEFINED 15	20	26	32	35	67
350	INC	INTEGER				REFS DEFINED 44	13	17	19	35	39
347	J	INTEGER				REFS DEFINED 15	69	DEFIN	16	34	84
352	JU	INTEGER				REFS 58	2*26	32	47	2*48	3*53
353	K	INTEGER				REFS 88	3*62	66	67	77	57
0	L	INTEGER				REFS 52	89	2*90	DEFINED	14	2*79
351	LS	INTEGER				REFS 56	56	61	65	25	46
354	M	INTEGER				REFS 31	32	75	76	30	31
345	N	INTEGER				REFS 73	75			31	
0	NDF	INTEGER				REFS 66	3*40	2*41	47	48	
0	NDX	INTEGER				REFS 67	2*76	2*77	84	88	
0	NF	INTEGER				REFS 35	39	40	43	89	
0	NX	INTEGER				REFS 40	10	DEFINED	1		
0	OPD	INTEGER				REFS 42	43	46	46		
0	OPH	INTEGER				REFS 74	22	37	41		
355	PROL	REAL				REFS 78	80	DEFINED	1		
356	PROLP	REAL				REFS 48	9	22	40	41	
0	X	REAL	ARRAY	F.P.		REFS 45	48	53	50	DEFINED	1
0						REFS 58	48	58	58	51	72
111	55					REFS 92	62	81	DEFINED	55	54
114	60					REFS 2*89	8	18	20	58	58
116	65					REFS 2*90	2*90	DEFINED	1	70	70
123	70										
131	75										
0	80										
0											
STATEMENT LABELS			DEF LINE	REFERENCES							
0	5		15	13	14						
0	15	INACTIVE	19	18							
0	20		21	19	20						
50	25	INACTIVE	24	18	20						
0	30		25	2*24							
0	35		26	25							
66	40	INACTIVE	28	24	2*27						
0	45		29	2*28							
0	50		32	30							
111	55		34	28							
114	60		37	18							
116	65		39	20							
123	70		41	36							
131	75		42	23	38						
0	80	INACTIVE	45	44	2*17						

```

115 PROLP=PROL/(ARG-X(J))+PROLP
120 CONTINUE
60   IF(0PH)160,125,160
125   DO 130 J=1,NF
130   ANS(J,DA)=PROLP*F(K,J)+ANS(J,DA)
      GO TO 200
135   HERLP=0.
      DO 145 J=LS,M
140   HERLP = 1. / (X(K)-X(J)) + HERLP
145   CONTINUE
      IF(INC)150,155,150
150   PROLP=HERLP
      GO TO 125
155   IF(OPD)110,160,110
160   JJ=NF
      DO 175 J=1,NF
175   JJ=JJ+1
      A=F(K,JJ)-2.*HERLP*F(K,J)
      B=(F(K,JJ)+*(ARG-X(K)))*PROLP
170   IF(OPD)170,165,165
165   ANS(J,1)=PROLP*B+ANS(J,1)
      IF(OPD)170,175,170
170   ANS(J,DA)=2.*PROLP*B+A*PROLP+ANS(J,DA)
175   CONTINUE
      GO TO 200
180   IF(K-1)185,135,185
185   A = 1.
      B = 1.
      DO 195 J=LS,M
195   IF(J.EQ.K)GO TO 195
      B=(X(K)-X(J))*B
      IF(J.NE.1)A=(X(1)-X(J))*A
195   CONTINUE
      PROLP=A/B
      GO TO 125
200   CONTINUE
250   RETURN
      END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	
3 HELGX	1	95	
VARIABLES	SN TYPE	RELOCATION	
360 A	REAL		
O ANS	REAL	ARRAY F.P.	REFS 77 90 92 DEFINED 76 85
O ARG	REAL	F.P.	REFS 8 53 62 79 81 81 15 26 32 53 62 79 DEFINED 18 20 48 58 77

```
1      SUBROUTINE HELGX( ARG ,ANS,X,F, NX , NF , L , NDF , NDX , OPH , OP )
```

```
C      BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
```

```
C      DOUBLE PRECISION PROL ,PROLP ,A ,B
```

```
C      ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
```

```
C
```

```
      DIMENSION ANS(NDF ,1),X(1),F(NDX ,1)
```

```
      INTEGER DA,OPH,OPD
```

```
      N=L-1
```

```
      DA=1
```

```
      IF(OPD.EQ.1)DA=2
```

```
      DO 5 I=1,DA
```

```
      DO 5 J=1,NF
```

```
      5 ANS(J,I)=0.
```

```
      INC = 0
```

```
      I=1
```

```
      IF(ARG-X(1))60,25,15
```

```
15     DO 20 I=2,NX
```

```
      IF(ARG-X(I))65,25,20
```

```
20     CONTINUE
```

```
      LS=NX-N
```

```
      GO TO 75
```

```
25     IF(OPD)40,30,30
```

```
30     DO 35 J=1,NF
```

```
35     ANS(J,1)=F(I,J)
```

```
      IF(OPD)40,250,40
```

```
40     IF(OPH)45,55,45
```

```
45     JU=NF
```

```
      DO 50 J=1,NF
```

```
      JU=JU+1
```

```
50     ANS(J,DA)=F(I,JU)
```

```
      GO TO 250
```

```
55     INC=1
```

```
      K=I
```

```
      GO TO 70
```

```
60     LS=1
```

```
      GO TO 75
```

```
65     K=1
```

```
      IF(K+K.LE.NX+1) K=K-1
```

```
70     LS=K-((K-1)*(N+1))/NX
```

```
75     M=LS+N
```

```
      DO 200 K=LS,M
```

```
      IF(INC)180,80,180
```

```
80     PROL = 1.
```

```
      DO 90 J=LS,M
```

```
      IF(K-J)85,90,85
```

```
85     PROL=(ARG-X(J))* (PROL/(X(K)-X(J)))
```

```
90     CONTINUE
```

```
      IF(OPH)135,95,135
```

```
95     IF(OPD)110,100,100
```

```
100    DO 105 J=1,NF
```

```
105    ANS(J,1)=PROL*F(K,J)+ANS(J,1)
```

```
      IF(OPD)110,200,110
```

```
110    PROLP=0.
```

```
      DO 120 J=LS,M
```

```
      IF(K-J)115,120,115
```

STATISTICS		
PROGRAM LENGTH	22268	1174
CM LABELED	23708	1272
COMMON LENGTH		
52000 CM USED		

ROUTINE	PICTUR	74/74	OPT=1	85/01/23. 08.10.44	FTN 4.8+577	PAGE
15						3
15	1351 B(II)=DOT VLAB=(VLAB+.5*VPERL)/VSCL VLABT=VLABT+10.*VPERL GO TO 1342				PICTUR 116 PICTUR 117 PICTUR 118 PICTUR 119 PICTUR 120 PICTUR 121 PICTUR 122 PICTUR 123 PICTUR 124 PICTUR 125 PICTUR 126 PICTUR 127 PICTUR 128 PICTUR 129 PICTUR 130 PICTUR 131 PICTUR 132 PICTUR 133 PICTUR 134 PICTUR 135 PICTUR 136 PICTUR 137 PICTUR 138 PICTUR 139 PICTUR 140 PICTUR 141 PICTUR 142 PICTUR 143 PICTUR 144 PICTUR 145 PICTUR 146 PICTUR 147 PICTUR 148 PICTUR 149 PICTUR 150 PICTUR 151 PICTUR 152 PICTUR 153 PICTUR 154 PICTUR 155 PICTUR 156 PICTUR 157 PICTUR 158 PICTUR 159 PICTUR 160 PICTUR 161 PICTUR 162 PICTUR 163 PICTUR 164 PICTUR 165 PICTUR 166 PICTUR 167	
20	1340 DO 1341 II=1,140,20 1341 B(II)=DOT 1342 CONTINUE IF(NPOINT-1) 890, 1380, 1360 890 IPRIT=1 GO TO 1890 1360 VVALV=0. IPRIT=3					
25	FPT=NPOINT DO 1370 II=1,NPOINT 1370 VVALV=VVALV+VTTEMP(II) VVALV=VVALV/(VSCL*FPT) GO TO 860 1380 VVALV=VTTEMP(1)/VSCL IPRIT=2					
30	860 CONTINUE BSYMO=BCDS(MID)					
35	JPT0=-1 DO 2500 II=1,NPOINT JJ=IP(II) JJJ=JSAVE(JJ) FJPT=(HTEMP(JJ)-HORG)/HPERC IF(FJPT.LT.0.) GO TO 2500 IF(FJPT.GT.(XCELLS+2.)) GO TO 2500 JPT=FJPT+1 IF(JPT.GE.102) GO TO 2500 DO 2540 III=1,MID IF(NPTS(III).GE.JJJ) GO TO 2541 2540 CONTINUE III=5					
40	2541 BSYM=PLTS(III) IF(JPT.NE.JPT0) GO TO 2550 IF(BSYM.NE.BSYM) BSYM=ASTRIC 2550 BSYM=BSYM JPT0=JPT					
45	2500 CONTINUE 1890 IFORM=IVLAB+IPRIT GO TO (1500,1500,1500,1800,1800,1IFORM 1500 WRITE (TAPEW,1501) GO TO 2100 1800 WRITE (TAPEW,1801) ASYM,VLAB,IVSCL,(B(LL),LL=1,NCELL) 2100 CONTINUE VNOW=VNEXT 1000 CONTINUE					
50	C C FORMATS C					
55	800 FORMAT(4X,12A1,2X,3H(/E13,1H)) 810 FORMAT(11X,11(4X,F6.2)) 841 FORMAT(18X,10A1) 1501 FORMAT(2X,11V,10D1)					
60						



SUBROUTINE PICTUR			74/74	OPT=1		FTN 4.8+577	85/01/23.	08.10.44	PAGE 5
VARIABLES	SN	TYPE	RELOCATION						
653	JJ	INTEGER				77			
665	JJJ	INTEGER				139	140	DEFINED	101 138
667	JPT	INTEGER				146	146	DEFINED	143
664	JPTO	INTEGER				144	150	DEFINED	
1551	JSAVE	INTEGER	ARRAY			150	150	DEFINED	
K	645	INTEGER				150	136	153	
LL	642	INTEGER				8	139	DEFINED	
MID	617	INTEGER				77	84	DEFINED	95 85
						REFS	85	DEFINED	71 158
						REFS	160	DEFINED	61 160
						REFS	135	DEFINED	145
2061	MPTS	INTEGER	ARRAY			28	31	DEFINED	30 32
NCELL	640	INTEGER				9	2*32	146	DEFINED
NDAT	621	INTEGER				REFS	158	160	DEFINED
0	NDATA	INTEGER		F.P.		64	66	160	55
NH	616	INTEGER				REFS	40	DEFINED	
NHTIC	633	INTEGER				39	39	DEFINED	1
NLINE	641	INTEGER				REFS	44	48	
NORD	640	INTEGER		F.P.		48	98	DEFINED	
NPOINT	647	INTEGER				REFS	61	61	
NPT	652	INTEGER				58	58	DEFINED	
0	NPTS	INTEGER	ARRAY	F.P.		REFS	72	56	
NV	615	INTEGER				REFS	38	38	
PLTS	673	PLTS	REAL	ARRAY		REFS	91	92	
VEXTRA	625	VEXTRA	REAL			REFS	91	93	
VLAB	657	VLAB	REAL			101	122	127	
VLABT	644	VLABT	REAL			REFS	122	128	
VNEXT	650	VNEXT	REAL			REFS	99	94	
VNOW	643	VNOW	REAL			REFS	30	30	
VON	0	VON	REAL	F.P.		REFS	39	44	
VONE	613	VONE	REAL			REFS	6	149	
VORG	626	VORG	REAL			REFS	45	54	
VPERL	637	VPERL	REAL			REFS	160	116	
						REFS	116	117	
						REFS	87	89	
						REFS	75	80	
						REFS	24	24	
						REFS	36	44	
						REFS	45	45	
						REFS	68	68	
						REFS	69	69	
						REFS	54	54	
						REFS	116	132	
						REFS	8	129	
						REFS	25	25	
						REFS	36	44	
						REFS	4	40	
						REFS	93	93	
						REFS	129	130	
						REFS	46	47	
						REFS	49	50	
						REFS	44	48	
						REFS	42	43	
						REFS	45	56	
						REFS	45	56	
						VARIABLES USED AS FILE NAMES, SEE ABOVE			
EXTERNALS		TYPE	ARGS			REFERENCES			
AORDER			4			40	99		
SCLINC			6			45	49		
SCLMAX			7			44	48		
INLINE FUNCTIONS		TYPE	ARGS			DEF LINE	REFERENCES		
ABS		REAL	1			INTRIN	43	47	
MOD		INTEGER	2			INTRIN	76		
SIGN		REAL	2			INTRIN	42	46	

SUBROUTINE PICTUR		74/74 OPT=1		FTN 4 . 8+577		85/01/23 . 08 . 10 . 44		PAGE	
STATEMENT LABELS		DEF LINE	REFERENCES						
0 1		30	29						
0 5		32	31						
0 8		34	33						
0 9		35							
62 10		41	38						
0 360		59	58						
0 700		63	62						
0 710	FMT	65	64						
560 800	FMT	168	60						
564 810	FMT	169	61						
567 841	FMT	170	66						
352 860		134	131						
0 890		123	122						
0 1000		163	72						
214 1010		77	86						
220 1020		80	78						
226 1030		84	81						
232 1040		87	80						
240 1050		91	87						
223 1120		82	79						
235 1140		89	82						
250 1300		97	84						
261 1319		103	97						
262 1320		104	102						
0 1330		105	104						
316 1340		119	2*113						
0 1341		120	119						
325 1342		121	118						
0 1350		114	113						
0 1351		115	114						
331 1360		125	122						
0 1370		129	128						
347 1380		132	122						
277 1400		111	2*106						
0 1410		107	106						
0 1420		108	107						
301 1430		112	110						
433 1500		158	3*157						
571 1501	FMT	171	158						
441 1800		160	3*157						
574 1801	FMT	172	160						
417 1890		156	124						
446 2100		161	159						
414 2500		155	137						
0 2540		147	145						
403 2541		149	146						
411 2550		152	150						
LOOPS	LABEL	FROM-TO	LENGTH	PROPERTIES					
24 1	1	29 30	2B	INSTACK					
32 5	1	31 32	3B	INSTACK					
40 8	1	33 34	3B	INSTACK					
136 360	1	58 59	3B	INSTACK					
154 700	1	62 63	3B	INSTACK					
162 710	1	64 65	3B	INSTACK					
203 10000	1	72 163	247B	EXT REFS NOT UNNED					

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SUBROUTINE PICTURE 74/74 OPT=1

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
265	1330	II	104-105	3B	INSTACK
305	1351	II	114-115	3B	INSTACK
321	1341	II	119-120	3B	INSTACK
340	1370	II	128-129	3B	INSTACK
356	2500	II	137-155	41B	NOT INNER
374	2540	III	145-147	6B	INSTACK
COMMON BLOCKS	CTAPES	LENGTH 50	MEMBERS - BIAS NAME(LENGTH) 0 ITAPES (50)		EXITS

STATISTICS

PROGRAM LENGTH	2213B	1163
CM LABELED COMMON LENGTH	62B	50
52000B CM USED		

SUBROUTINE AORDER 74/74 OPT=1

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```

1      C      SUBROUTINE AORDER (A,N,IPERM,NCON)
          K = 1
          M1 = IABS(N)
          DO 10 I=1,M1
   10     L = K
          K = K + 1
          IF (K - M1) 110,110,170
   110    DO 140 I = 1,L
   140    INDI=IPERM(I)
          IF (NCON)180,180,200
   180    IF (N)120,170,130
   120    IF (A(K)-A(1))140,140,150
   130    IF (A(K) - A(I))150,140,140
   200    IF (N)220,270,230
   220    IF (A(K) .GT. A(INDI)) GO TO 250
          GO TO 140
   230    IF (A(K) .LT. A(INDI)) GO TO 250
   140    CONTINUE
          GO TO 100
   150    X = A(K)
          J = K
          DO 160 M = I,L
   160    A(J) = A(J-1)
          J = J - 1
          A(1) = X
          GO TO 100
   250    J=K
          DD 260 M=I,L
          IPERM(J)=IPERM(J-1)
   260    J=J-1
          IPERM(1)=K
          GO TO 100
   270    CONTINUE
   170    RETURN
          END

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS 3 AORDER	DEF LINE 1	REFERENCES 37
VARIABLES	SN TYPE	RELOCATION
O  A	REAL	ARRAY F.P.
115  I	INTEGER	
117  INDI O  IPERM	INTEGER INTEGER	ARRAY F.P.
121  J	INTEGER	
		REFS
		DEFINED
	1	2*15
	REFS	2*16
	2*7	28
	DEFINED	12
	6	15
	REFS	11
	18	20
	REFS	12
	3	32
	REFS	DEFINED
	2*26	1
	27	7
	2*32	33
	REFS	DEFINED
	24	24
		27

SUBROUTINE ORDER		74/74 OPT=1		RELOCATION		FTN 4.8+577		85/01/23. 08.10.44		PAGE
VARIABLES	SN	TYPE								2
113	K	INTEGER								18
116	L	INTEGER								9
122	M	INTEGER								4
114	M1	INTEGER								6
0	NCON	REAL	F.P.	F.P.	REFS	6	10	DEFINED	DEFINED	1
120	X	REAL			REFS	5	14	17	DEFINED	5
					REFS	13	17	1	DEFINED	1
					REFS	28	23	28	DEFINED	23
INLINE FUNCTIONS		TYPE	ARGS	INTRIN	DEF LINE	REFERENCES				
STATEMENT LABELS			DEF LINE		REFERENCES					
0	10		7	6						
17	100		8	22						
0	110	INACTIVE	11	2*10						
0	120	INACTIVE	15	14						
35	130		16	14						
51	140		21	11	2*15					
54	150		23	15	16					
0	160		27	25						
112	170		37	10						
0	180	INACTIVE	14	2*13						
41	200		17	13						
0	220	INACTIVE	18	17						
46	230		20	17						
74	250		30	18						
0	260		33	31						
112	270		36	17						
LOOPS	LABEL	INDEX	FROM TO	LENGTH	PROPERTIES					
14	10	I	6 7	28	INSTACK					
24	140	I	11 21	30B	OPT					
65	160	M	25 27	28	INSTACK					
103	260	M	31 33	28	INSTACK					
STATISTICS	PROGRAM LENGTH	52000B CM USED	140B	96						

```

1      C          SUBROUTINE SCLMAX(A,N,ISCL,AONE,ATWO,XCON,NN)
2
3      DIMENSION A(1)
4      IF(XCON LT.0.)GO TO 101
5      AMIN=A(1)
6      AMAX=AMIN
7      DO 100 I=2,N
8         AMAX =  AMAX1 (AMAX,A(I))
9         AMIN =  AMIN1(AMIN,A(I))
10    CONTINUE
11    AONE = .5*(AMAX+AMIN-NN*(AMAX-AMIN))
12    ATWO=AONE+NN*(AMAX-AMIN)
13    KOUNT=0
14    KOUNT2=0
15    ABONE=ABS(AONE)
16    ABTWO=ABS(ATWO)
17    ZMAX=ABONE
18    ZMIN=ABTWO
19    IF(ABTWO.GT.ABONE) GO TO 10
20    GO TO 11
21    KOUNT = 1
22    ZMAX=ABTWO
23    ZMIN=ABONE
24    SN1=AONE*ATWO
25    IF(SN1.LT.0.0) GO TO 13
26    AD=(ZMAX/(5.-ZN))
27    AZ=ZN*AD
28    IF(AZ-ZMIN) 14,15,15
29    CONTINUE
30    ZN=J
31    AD=ROUND(AD,ISCL)
32    SCLMAX
33    SCLMAX
34    SCLMAX
35    AD=(ZMIN/2.)
36    IF((AD.GE.1.0.OR.AD.LE.10.0) AA = ALOG10(AD)
37    ISCL = INT(AA)
38    IF ((SIGN(1.0,AA).GT.0.0.AND.FLOAT(ISCL).EQ.AA) ISCL = ISCL - 1
39    IF ((SIGN(1.0,AA).LT.0.0.AND.FLOAT(ISCL).NE.AA) ISCL = ISCL - 1
40    IF(XCON LT.0.0 AND .SN1.GE.0.0) GO TO 18
41    IF(KOUNT2.EQ.1) GO TO 18
42    AD = ROUND(AD,ISCL)
43    KOUNT2=1
44    SCLMAX
45    IF(SN1.GE.0.0) GO TO 16
46    IF(KOUNT.EQ.1) GO TO 19
47    SN2=SIGN(1.0,ATWO)
48    IF(ZN.EQ.3.0) GO TO 20
49    ATWO =SN2*ZN*AD
50    AONE=-SN2*(5.-ZN)*AD
51    GO TO 21
52    ATWO=SN2*2.*AD
53    AONE=-SN2*3.*AD
54    AD=ABS(AONE)
55    GO TO 15
56    SCLMAX
57    SN2=SIGN(1.0,AONE)
58    IF(ZN.EQ.2.0) GO TO 22
59
```

SUBROUTINE SCLMAX 74/74 OPT=1

```

AONE=SN2*ZN*AD
ATWO=-SN2*(5.-ZN)*AD
GO TO 23
22 AONE=SN2*2.*AD
ATWO=-SN2*3.*AD
23 AD=ABS(ATWO)
GO TO 15
16 IF (KOUNT.EQ.1) GO TO 17
ATWO=0.O
SN3=SIGN(1.O,AONE)
AONE=SN3*AD
GO TO 18
17 AONE=0.O
SN3=SIGN(1.O,ATWO)
ATWO=SN3*AD
18 CONTINUE
RETURN
END
75

```

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```

SCLMAX 59
SCLMAX 60
SCLMAX 61
SCLMAX 62
SCLMAX 63
SCLMAX 64
SCLMAX 65
SCLMAX 66
SCLMAX 67
SCLMAX 68
SCLMAX 69
SCLMAX 70
SCLMAX 71
SCLMAX 72
SCLMAX 73
SCLMAX 74
SCLMAX 75
SCLMAX 76

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES						
3 SCLMAX	1	74						
VARIABLES	SN	TYPE	RELOCATION					
0 A		REAL	ARRAY F.P.					
243 AA		REAL	REFS 38	2*39	8	DEFINED 1		
232 ABONE		REAL	REFS 17	19	23	DEFINED 36	37	
233 ABTWO		REAL	REFS 18	19	22	DEFINED 15		
237 AD		REAL	REFS 31	2*36	3*37	DEFINED 16		
			REFS 53	58	43	DEFINED 49	50	52
			DEFINED 26	30	35	DEFINED 48		
			REFS 8	2*11	12	DEFINED 6		
			REFS 6	9	2*11	DEFINED 5	5	9
			REFS 12	15	24	DEFINED 56	67	
			DEFINED 1	11	50	DEFINED 58	61	68
0 ATWO	REAL		REFS 70					
			F.P. DEFINED 16	24	47	DEFINED 71		
			REFS 72	12	49	DEFINED 59	62	66
			REFS 8	9	31			
			REFS 2*39	2*40	43	DEFINED 7	1	38
			REFS 40					39
242 AZ	REAL		REFS 29					
227 I	INTEGER		REFS 46	65	DEFINED 28			
0 ISCL	INTEGER		REFS 42	DEFINED 14	13	DEFINED 44		
			REFS 7	7	12	DEFINED 1		
240 J	INTEGER		REFS 11	4	45	DEFINED 1		
230 KOUNT	INTEGER		REFS 25	50	52	DEFINED 24		
231 KOUNT2	INTEGER		REFS 49	47	56	DEFINED 58	59	61
0 N	INTEGER		REFS 62	62	DEFINED 77	DEFINED 71		
0 NN	INTEGER		REFS 63					
236 SN1	REAL							
244 SN2	REAL							
245 SN3	REAL							

SUBROUTINE SCLMAX      74/74      OPT=1

VARIABLES	SN	TYPE	RELOCATION F.P.
0 XCON		REAL	REFS
234 ZMAX		REAL	REFS
235 ZMIN		REAL	REFS
241 ZN		REAL	REFS

EXTERNALS      TYPE      ARGS      REFERENCES

ALOG10	REAL	1	LIBRARY	37
ROUND	REAL	2		43

INLINE FUNCTIONS      TYPE      ARGS      DEF LINE      REFERENCES

ABS	REAL	1	INTRIN	15
AMAX1	REAL	0	INTRIN	8
AMIN1	REAL	0	INTRIN	9
FLOAT	REAL	1	INTRIN	39
INT	INTEGER	1	INTRIN	40
SIGN	REAL	2	INTRIN	38

STATEMENT LABELS      DEF LINE      REFERENCES

43	10	21	19
47	11	24	20
54	13	28	25
0	14	33	28
71	15	36	27
177	16	65	45
206	17	70	65
213	18	73	41
156	19	56	46
146	20	52	48
153	21	54	51
167	22	61	57
174	23	63	60
0	100	10	7
33	101	13	4

LOOPS      LABEL      INDEX      FROM-TO      LENGTH      PROPERTIES

15	100	I	7 10	6B	INSTACK
55	14	J	28 33	11B	OPT

STATISTICS      PROGRAM LENGTH      246B      166  
52000B CM USED

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FUNCTION ROUND 74/74 OPT=1

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EINCLITION

## ROUND OFF ROUTINE FOR SCALING

```

C
      5      ISCL = ISCL - 1
      AX = X / 10.0 ** ISSL
      BX = IFIX(AX)
      DX = ABS(AX) - ABS(BX)
      RDX = ABS(DX) / ABS(AX)
      IF (RDX GT 0.01) GO TO 5
      DX = 0.0
      GO TO 10
      5 CONTINUE
      IF (DX LE 0.5) DX = SIGN(0
      IF (DX GT 0.5) DX = SIGN(1
      10 ROUND = (BX + DX) * 10.0 ** ISSL
      RETURN
      END

```

SYMBOLIC DIFFERENCE MAP (B=2)

ENTRY POINTS	DEF	LINE	REFERENCES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 229 230 231 232 233 234 235 236 237 238 239 239 240 241 242 243 244 245 246 247 248 249 249 250 251 252 253 254 255 256 257 258 259 259 260 261 262 263 264 265 266 267 268 269 269 270 271 272 273 274 275 276 277 278 279 279 280 281 282 283 284 285 286 287 288 289 289 290 291 292 293 294 295 296 297 298 299 299 300 301 302 303 304 305 306 307 308 309 309 310 311 312 313 314 315 316 317 318 319 319 320 321 322 323 324 325 326 327 328 329 329 330 331 332 333 334 335 336 337 338 339 339 340 341 342 343 344 345 346 347 348 349 349 350 351 352 353 354 355 356 357 358 359 359 360 361 362 363 364 365 366 367 368 369 369 370 371 372 373 374 375 376 377 378 379 379 380 381 382 383 384 385 386 387 388 389 389 390 391 392 393 394 395 396 397 398 399 399 400 401 402 403 404 405 406 407 408 409 409 410 411 412 413 414 415 416 417 418 419 419 420 421 422 423 424 425 426 427 428 429 429 430 431 432 433 434 435 436 437 438 439 439 440 441 442 443 444 445 446 447 448 449 449 450 451 452 453 454 455 456 457 458 459 459 460 461 462 463 464 465 466 467 468 469 469 470 471 472 473 474 475 476 477 478 479 479 480 481 482 483 484 485 486 487 488 489 489 490 491 492 493 494 495 496 497 498 499 499 500 501 502 503 504 505 506 507 508 509 509 510 511 512 513 514 515 516 517 518 519 519 520 521 522 523 524 525 526 527 528 529 529 530 531 532 533 534 535 536 537 538 539 539 540 541 542 543 544 545 546 547 548 549 549 550 551 552 553 554 555 556 557 558 559 559 560 561 562 563 564 565 566 567 568 569 569 570 571 572 573 574 575 576 577 578 579 579 580 581 582 583 584 585 586 587 588 589 589 590 591 592 593 594 595 596 597 598 599 599 600 601 602 603 604 605 606 607 608 609 609 610 611 612 613 614 615 616 617 618 619 619 620 621 622 623 624 625 626 627 628 629 629 630 631 632 633 634 635 636 637 638 639 639 640 641 642 643 644 645 646 647 648 649 649 650 651 652 653 654 655 656 657 658 659 659 660 661 662 663 664 665 666 667 668 669 669 670 671 672 673 674 675 676 677 678 679 679 680 681 682 683 684 685 686 687 688 689 689 690 691 692 693 694 695 696 697 698 699 699 700 701 702 703 704 705 706 707 708 709 709 710 711 712 713 714 715 716 717 718 719 719 720 721 722 723 724 725 726 727 728 729 729 730 731 732 733 734 735 736 737 738 739 739 740 741 742 743 744 745 746 747 748 749 749 750 751 752 753 754 755 756 757 758 759 759 760 761 762 763 764 765 766 767 768 769 769 770 771 772 773 774 775 776 777 778 779 779 780 781 782 783 784 785 786 787 788 789 789 790 791 792 793 794 795 796 797 798 799 799 800 801 802 803 804 805 806 807 808 809 809 810 811 812 813 814 815 816 817 818 819 819 820 821 822 823 824 825 826 827 828 829 829 830 831 832 833 834 835 836 837 838 839 839 840 841 842 843 844 845 846 847 848 849 849 850 851 852 853 854 855 856 857 858 859 859 860 861 862 863 864 865 866 867 868 869 869 870 871 872 873 874 875 876 877 878 879 879 880 881 882 883 884 885 886 887 888 889 889 890 891 892 893 894 895 896 897 898 899 899 900 901 902 903 904 905 906 907 908 909 909 910 911 912 913 914 915 916 917 918 919 919 920 921 922 923 924 925 926 927 928 929 929 930 931 932 933 934 935 936 937 938 939 939 940 941 942 943 944 945 946 947 948 949 949 950 951 952 953 954 955 956 957 958 959 959 960 961 962 963 964 965 966 967 968 969 969 970 971 972 973 974 975 976 977 978 979 979 980 981 982 983 984 985 986 987 988 989 989 990 991 992 993 994 995 996 997 998 999 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1319 1320 1321 1322 1323 1324 1325 1326 1327 1328 1329 1329 1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1339 1340 1341 1342 1343 1344 1345 1346 1347 1348 1349 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1369 1370 1371 1372 1373 1374 1375 1376 1377 1378 1379 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1389 1390 1391 1392 1393 1394 1395 1396 1397 1398 1399 1399 1400 1401 1402 1403 1404 1405 1406 1407 1408 1409 1409 1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1419 1420 1421 1422 1423 1424 1425 1426 1427 1428 1429 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439 1439 1440 1441 1442 1443 1444 1445 1446 1447 1448 1449 1449 1450 1451 1452 1453 1454 1455 1456 1457 1458 1459 1459 1460 1461 1462 1463 1464 1465 1466 1467 1468 1469 1469 1470 1471 1472 1473 1474 1475 1476 1477 1478 1479 1479 1480 1481 1482 1483 1484 1485 1486 1487 1488 1489 1489 1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1499 1500 1501 1502 1503 1504 1505 1506 1507 1508 1509 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519 1519 1520 1521 1522 1523 1524 1525 1526 1527 1528 1529 1529 1530 1531 1532 1533 1534 1535 1536 1537 1538 1539 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1549 1550 1551 1552 1553 1554 1555 1556 1557 1558 1559 1559 1560 1561 1562 1563 1564 1565 1566 1567 1568 1569 1569 1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1579 1580 1581 1582 1583 1584 1585 1586 1587 1588 1589 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599 1599 1600 1601 1602 1603 1604 1605 1606 1607 1608 1609 1609 1610 1611 1612 1613 1614 1615 1616 1617 1618 1619 1619 1620 1621 1622 1623 1624 1625 1626 1627 1628 1629 1629 1630 1631 1632 1633 1634 1635 1636 1637 1638 1639 1639 1640 1641 1642 1643 1644 1645 1646 1647 1648 1649 1649 1650 1651 1652 1653 1654 1655 1656 1657 1658 1659 1659 1660 1661 1662 1663 1664 1665 1666 1667 1668 1669 1669 1670 1671 1672 1673 1674 1675 1676 1677 1678 1679 1679 1680 1681 1682 1683 1684 1685 1686 1687 1688 1689 1689 1690 1691 1692 1693 1694 1695 1696 1697 1698 1699 1699 1700 1701 1702 1703 1704 1705 1706 1707 1708 1709 1709 1710 1711 1712 1713 1714 1715 1716 1717 1718 1719 1719 1720 1721 1722 1723 1724 1725 1726 1727 1728 1729 1729 1730 1731 1732 1733 1734 1735 1736 1737 1738 1739 1739 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1749 1750 1751 1752 1753 1754 1755 1756 1757 1758 1759 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1769 1770 1771 1772 1773 1774 1775 1776 1777 1778 1779 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1789 1790 1791 1792 1793 1794 1795 1796 1797 1798 1799 1799 1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048			

VARIABLES	SN	TYPE	REAL
50	AX		
51	BX		

52		DX	REAL				REFS	9
0	ISCL		INTEGER			F. P.	14	15
47	ISSL		INTEGER				REFS	5
53	RDX		REAL				REFS	6
46	ROUND		REAL				REFS	10
0	X		REAL				DEFINED	16
						F. P.	REFS	6
INLINE FUNCTIONS				ARGS		DEF LINE	REFERENCES	2*9
	ABS		REAL	1	INTRIN		2*8	
	IFIX		INTEGER	1	INTRIN			
	SIGN		REAL	2	INTRIN			

STATEMENT	LABELS	DEF	LINE	REFERENCES
24	5		13	10
35	10		16	12

STATISTICS  
PROGRAM LENGTH  
52000B CM USED

DEFINED	6	11
7		
16	DEFINED	8
5		1
DEFINED		

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SUBROUTINE SCLINC 74/74 OPT=1 FTN 4.8+577 85/01/23 08 10.44 PAGE 1

```

1      SUBROUTINE SCLINC(AONE,ATWO,XX,EXTRA,ACRG,IA)
2
3      IF(IA)110,110,120
4      XINCH=XX/10.
5      GO TO 100
6
7      110 XINCH =XX/5.
8      100 AORG=AONE
9      EXTRA= (ATWO-AONE)/XINCH
10     RETURN
11     END

```

## SYMBOLIC REFERENCE MAP (B=3)

ENTRY POINTS	SCLINC	DEF LINE	REFERENCES
3		1	9

VARIABLES	SN	TYPE	RELOCATION
O AONE		REAL	F.P.
O AORG		REAL	F.P.
O ATWO		REAL	F.P.
O EXTRA		REAL	F.P.
O IA		INTEGER	F.P.
23 XINCH		REAL	F.P.
O XX		REAL	F.P.

STATEMENT	LABELS	DEF	LINE	REFERENCES
14	100		7	5
12	110		6	2 * 3
O	120	INACTIVE	4	3

STATISTICS  
PROGRAM LENGTH  
52000B CM USED

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SUBROUTINE SCLINC      74/74      OPT=1

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SCL INC SCL INC

1	DEFINED	1
7	DEFINED	1
8	DEFINED	1
8	DEFINED	1
6	DEFINED	4
6	DEFINED	6

SCL INC SCL INC

FUNCTION FATAN

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1      FUNCTION FATAN (X,Y)
2      C      PROGRAM TO ASSIGN QUADRANT FOR PHASE ANGLE ****
3      C      1.OE+06
4      A      = ABS (X*C)
5      B      = ABS (Y*C)
6      AX     = ABS (X)
7      AY     = ABS (Y)
8      IF (A.LE.AY) GO TO 1
9      IF (AX.GE.B) GO TO 2
10     FATAN = ATAN2 (X,Y)
11     GO TO 3
12     1      FATAN = 0.0
13     GO TO 3
14     2      FATAN = 1.570796 * SIGN(1.0*X) * SIGN(1.0,Y)
15     3      RETURN
16     END
17

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
4      FATAN	1	15	RELOCATION	REFS	8	DEFINED
VARIABLES	SN	TYPE		REFS	9	DEFINED
37      A		REAL		REFS	8	DEFINED
41      AX		REAL		REFS	7	DEFINED
42      AY		REAL		REFS	7	DEFINED
40      B		REAL		REFS	5	DEFINED
36      C		REAL		REFS	4	DEFINED
35      FATAN		REAL	DEFINED	10	12	14
0      X		REAL	REFS	4	6	14
0      Y		REAL	REFS	5	7	10
EXTERNALS	TYPE	ARGS	REFERENCES			
ATAN2	RELi.	2	LIBRARY 10			
INLINE FUNCTIONS	TYPE	ARGS				
ABS	REAL	1	INTRIN	4	5	6
SIGN	REAL	2	INTRIN	2*14		
STATEMENT LABELS	DEF LINE	REFERENCES				
22      1	12	8				
24      2	14	9				
31      3	15	11				
STATISTICS						
PROGRAM LENGTH	43B	35				
52000B CM USED						

SUBROUTINE RODDEN 74/74 OPT=1

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1      C      SUBROUTINE RODDEN
2
3      C      COMPLEX B(40,40), DETAD(40,40), GENFM(40,40)
4      C      COMPLEX AUGM(530), WQ(130)
5      C      COMPLEX GENFT
6
7      DIMENSION QMWT(40,5), QWT(5)
8      DIMENSION VBO(30), RVBO(15)
9      DIMENSION LC(40)
10     DIMENSION LIM(50,3)
11     DIMENSION WW(40,40), OMG(40)
12     DIMENSION COEFP(50) .
13     DIMENSION ZIN(50)
14     DIMENSION ITAPES(50), IFILES(50)
15     DIMENSION TSFH(1)
16     DIMENSION NAMDUB(2), NAME(2)
17
18     COMMON /VARBLS / NCNSM1,NB,NDELT,NDATA,NOPAN,IQ,IR,JSPECs,
19     NCARAY(50),NSARAY(50),NBARY(50),ACAP,B2,FL,PI,
20     KR,KRDBR,GMA(50),X(400),Y(400),ZZ(400),Z1(400),
21     P1(400),ZZ1(400),P2(400),ZZ2(400),
22     EV(400),PV(400),ZV(400),SDEIX(400),DELY(400),
23     XO(50),YO(50),ZO(50),GGMA(50)
24
25     COMMON /XYZ/YS(50),DELYS(50),ZS(50),DELZS(50),CWIG(50)
26     COMMON /XYZ/ .DUMMY(50)
27     COMMON /XYZ/ X1A(50), X3A(50), X5A(50), X7A(50), X2A(50)
28     COMMON /XYZ/ X0C(400), X1J(50)
29     COMMON /P1GW/ CT1(50),CT2(50),TS(50)
30     COMMON /NTPS/ NTP1,NTP2,NTP3,NTP4,NTP5,NTP6,NTP7,NTP8,NTP9,NTP10
31     COMMON /BODY/ RO(100).ROP(100),NBEA(20),BGMA(20),MRK(20,2),
32     XBO(20), YBO(20), ZBO(20)
33
34     REAL K10,K20,K1RT1,K1IT1,K2RT2P,K1IT2P,K10T1,K20T2P
35     REAL KR,KRDBR
36
37     COMMON /DLM/ K10,K20,K1RT1,K1IT1,K2RT2P,K1IT2P,K10T1,K20T2P,E2
38     COMMON /MODD/ B,DETAD,WW,OMG,NC
39     COMMON /FLUTAN/ FMACH,BETA,VBO,NRVBO
40     COMMON /COMA/ COMA/LC,CR
41     COMMON /CTAPES/ ITAPES
42     COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP
43     COMMON /ACTSHF/ LTSHF,TSHF
44     COMMON /CLIST/ KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE
45     COMMON /CTABLE/ KTABLE,NPASS,NROWS,NCOLS,NCOLST,KTABLO,NPAGEA
46
47     COMMON /CFILES/ ITAPET
48     COMMON /CFILES/ KFILES,IFILES
49
50     C      INTEGER RHSTAP
51
52     LOGICAL KOINT
53
54     DATA NAMDUB /4HDOUB,4H-AIC/
55     C      INITIAL CONDITIONS
56
57     CALL PROGNA (4H(ROD,4HDEN))
```

```

COEF   = 1.0          173
YDIF   = YCAP(2) - YCAP(1)    PART1
ZDIF   = ZCAP(2) - ZCAP(1)    PART1
175    IF (ABS(YDIF).LT.SMALL_) GO TO 540    PART1
      CALL ATAN3(ZDIF,YDIF,ATANA)    PART1
      GMA(ILLOOP) = ATANA    PART1
      GO TO 550    PART1
      540 GMA(ILLOOP) = PI/2.0    PART1
      IF (ZDIF.LT.0.0) GMA(ILLOOP)=-PI/2.0    PART1
      550 GMAS(ILLOOP)=(GMA(ILLOOP)*180.0)/PI    PART1
      FOUR = XCAP(4) - XCAP(3) - XCAP(2) + XCAP(1)    PART1
      DIFF31 = XCAP(3) - XCAP(1)    PART1
      DIFF21 = XCAP(2) - XCAP(1)    PART1
      DEL1 = DIFF21    PART1
      00 560 M = NCRUN,NCEND    PART1
      00 560 N = NSRUN,NSEND    PART1
      J = M + NC * (N-1)    PART1
      C *** INDEX -J- EQUALS SUBSCRIPT(M,N)    PART1
      C *** K = (M+1) + NC * (N-1)    PART1
      C *** L = M + NC * N    PART1
      C *** INDEX -K- EQUALS SUBSCRIPT (M+1, N)    PART1
      C *** INDEX -L- EQUALS SUBSCRIPT (M, N+1)    PART1
      C *** KL = (M+1) + NC * N    PART1
      C *** INDEX -KL- EQUALS SUBSCRIPT (M+1, N+1)    PART1
      C *** ZETA(J)=COEF*(TAU(N)*((TH(M)*FOUR) +DIFF31) + TH(M)*DEL1 + X1)    PART1
      195  PNUP = YDIF*TAU(N)    PART1
      PNU(J) = Y1 + PNUP    PART1
      ZEEP = ZDIF*TAU(N)    PART1
      ZEE(J) = ZEE1 + ZEEP    PART1
      196 CONTINUE    PART1
      197  JLIMIT = NC * NS    PART1
      LIM1 = 1    PART1
      LIM2 = JLIMIT    PART1
      J = JBEGIN    PART1
      198 DO 570 I = LIM1,LIM2,NC    PART1
      IPNC = 1+NC    PART1
      XI(J) = (ZETA(I) + ZETA(IPNC)) / 2.    PART1
      199 570 J = J + 1    PART1
      C   JCU = LIM1 - 1    PART1
      IR = -1    PART1
      KRETUR = -3    PART1
      200 525 CALL HEAD (LTSHF, TSHF, IROWS, JLIMIT)    PART1
      GO TO (526, 527, 528), KHEAD    PART1
      201 526 WRITE (ITAPEW,200) ILOOP,NCNSM1,JLIMIT    PART1
      202 527 CALL PLB (1,1,ITAPEW)    PART1
      203 528 WRITE (ITAPEW,172) JCL, (ZETA(JC), JC=JCL, JCU)    PART1
      204 IF (KRETUR .LT. 3) GO TO 525    PART1
      C

```

```

115      NSOFAR = 0
      DO 630 LOOP = 1, NOPAN
      CALL TITLES (2)
      ILOOP = LOOP
      WRITE (ITAPEW, 60) ILOOP
      KOUNT = KOUNT + 2
      CALL PLB (1, ITAPEW)
      READ (ITAPER, 10) XO(LOOP), YO(LOOP), ZO(LOOP), GGMAS
      GGMAS(LOOP) = GGMAS*PI/180.0
      READ (ITAPER, 10) XCAP(1), XCAP(2), XCAP(3), XCAP(4), YCAP(1), YCAP(2)
      READ (ITAPER, 25) ZCAP(1), ZCAP(2), NS, NC, COEFF
      COEFF(ILOOP)=COEFF
      IF (COEFF.EQ.0.0) COEFF(ILOOP)=1.0
      X1 = XCAP(1)
      Y1 = YCAP(1)
      ZIN(ILOOP)= ZEE1
      CT1(ILOOP)= XCAP(2)-XCAP(1)
      CT2(ILOOP)= XCAP(4)-XCAP(3)
      KOUNT = KOUNT + 5
      CALL PLB (1, ITAPEW)
      WRITE (ITAPEW, 30) XCAP(1), YCAP(1), NC, XCAP(2), YCAP(2), NS
      1 NCNSM1 = (NC-1) * (NS-1)
      NCARRY(ILoop) = NC
      NSARRY(ILoop) = NS
      NCRUN = 1
      NCEND = NC
      NSRUN = 1
      NSEND = NS
145      C INPUT CHORDWISE DIVISIONS *****
      READ (ITAPER, 10) (TH(I), I = 1, NC)
      C INPUT SPANWISE DIVISIONS *****
      READ (ITAPER, 10) (TAU(I), I = 1, NS)
      C LSKIP = 1
      LSUB = 3
      JCU = NCRUN - 1
      IR = -1
      KRETUR = -3
      505 CALL HEAD (LTSHF, TSHF, IROWS, NCEND )
      GO TO (506, 507, 508), KHEAD
      506 WRITE (ITAPEW, 180) ILOOP, NC
      507 CALL PLB (1, ITAPEW)
      508 WRITE (ITAPEW, 172) JCL, ( TH(JC), JC=JCL, JCU)
      IF (KRETUR .LT. 3) GO TO 505
      C JCU = NSRUN - 1
      IR = -1
      KRETUR = -3
      515 CALL HEAD (LTSHF, TSHF, IROWS, NSEND )
      GO TO (516, 517, 518), KHEAD
      516 WRITE (ITAPEW, 190) ILOOP, NS
      517 CALL PLB (1, ITAPEW)
      518 WRITE (ITAPEW, 172) JCL, ( TAU(JC), JC=jCL, jCU)

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        IVAR( 5) = 2          59
        IVAR( 6) = 11         PART1
        IVAR( 7) = 5          PART1
        IVAR( 8) = 8          PART1
        IVAR( 9) = 3          PART1
        IVAR(10) = 12         PART1
        IVAR(11) = 6          PART1
        IVAR(12) = 9          PART1
        IVAR(13) = 13         PART1
        IVAR(14) = 14         PART1
    ITAPER = ITAPES(5)      PART1
    ITAPEW = ITAPES(6)      PART1
    PI = 3.1415926          PART1
    DO 460 I = 1, 50        PART1
    TH(I) = 0.                PART1
    TAU(I) = 0.                PART1
    GMA(I) = 0.                PART1
    GMAS(I)= 0.0              PART1
    460 F(I) = 0.            PART1
    DO 470 I = 1,400          PART1
    ZETA(I) = 0.            PART1
    PNU(I) = 0.            PART1
    ZEE(I)= 0.            PART1
    DELZ(I) = 0.            PART1
    470 CONTINUE             PART1
    DO 480 I = 1,50          PART1
    CWIG(I) = 0.0            PART1
    DO 490 I = 1,50          PART1
    FGAMMA(I)= 0.            PART1
    YS(I) = 0.            PART1
    ZS(I) = 0.            PART1
    DELZS(I) = 0.            PART1
    490 DELYS(I) = 0.          PART1
    NSOFAR = 0.            PART1
    JBEGIN = 1.            PART1
    JCUM = 0.            PART1
    CALL PROGNA (4H(PAR, 4HT)) 95
    IF ((LINES-KOUNT) .LT. 4) KOUNT = LINES
    CALL TITLES (3)          PART1
    CALL PLB (1,1,ITAPEW)    PART1
    WRITE (ITAPEW,2000)       PART1
    CALL PLB (1,1,ITAPEW)    PART1
    KOUNT = KOUNT + 4        PART1
    NROWS = 1.            PART1
    NCOLS = 0.            PART1
    KTABLE = 2.            PART1
    CALL PTABLE (2,51,51)    PART1
    1 HSURFACE AND BODY GEOMETRY AND ASSOCIATED PARAMETERS)
    KOLUMN = 8.            PART1
    IF (KREPOR .EQ. 2) KOLUMN = 4        105
    *****
    C *** REFSPN = B = B2 IS THE REFERENCE SEMI-SPAN ***
    C *** REFCHD = REFERENCE CHORD = FL IN PROG. CALC.
    110   C           WRITE (ITAPEW,40) FL, B2, ACAP, FMACH, BETA
    KOUNT = KOUNT + 6        PART1
    CALL PLB (1,1,ITAPEW)    PART1
    *****

```

```

1      C          SUBROUTINE PART1(JCUM, COEFFB, COEFB, YIN, ZIN)
2
3      C          REAL   KR, KRDDBR
4
5      C          DIMENSION IVAR(14)
6      C          DIMENSION TSHF(1)
7      C          DIMENSION VAR(400, 14)
8      C          DIMENSION LC(40)
9
10     C          COMMON /VARBLS / NNSM1, NB, NDELT, NDATA, NOPAN, IQ, IRD, JSPECS,
11           NCARAY(50), NSARAY(50), NBARY(50), ACAP, B2, FL, PI,
12           KR, KRDDBR, GMA(50) X(400), Y(400), Z(400),
13           P1(400), Z2(400), P2(400), Z1(400),
14           EV(400), PV(400), ZV(400), SDELX(400), DELY(400),
15           XO(50), YO(50), ZO(50), GGMA(50),
16           DELYS(50), DELZS(50),
17           CWIG(50), FGAMMA(50),
18           FGGAM(50),
19           XOC(400), X1J(50),
20           CT1(50), CT2(50), TS(50),
21           FMACH, 'BETA', 'VBO', 'RVBO',
22           MODV, YA(400) , ZA(400)
23
24     C          DIMENSION VBD(30),
25           XCAP(4), YCAP(2), ZCAP(2), GMAS(50),
26           ZETA(400), PNUI(400), ZEE(400), TH(50), TAU(50), DELZ(400) , RAD(50),
27           COEF(50) ,
28           YIN(50) ,
29           DIMENSION ITAPES(50)
30
31     C          COMMON/BODY/ RO(100), ROP(100), NBEA(20), BGMA(20), MRK(20,2),
32           XBO(20), YBO(20), ZBO(20),
33           COMMON /CDMA / LC, BR
34           COMMON /CTAPES / ITAPES
35           COMMON /CTSHF / LTSHF , TSHF
36           COMMON /CLIST / KOUNT , KPAGE , LINES , LINEST, KLABEL, KTPAGE, NPAGE
37           COMMON /KPAGE / LINESG, KOUNTH, KOUNTI
38           COMMON /CTABLE/ KTABLE, NPASS , NROWS , NCOLS , NCOLST, KTABLO, NPAGEA
39           COMMON /REPORT/ KREPORT
40           COMMON /CHEAD / KHEAD, KRETUR, KOLUMN, IR, JCL, JCU, LSUB, LSKIP
41
42     C          EQUIVALENCE (VAR(1,1), X(1))
43
44     C          C FUNCTION DEFINITION
45           C          MINOF(I,J) = MINO(I,J)
46
47     C          C INITIAL CONDITIONS
48
49     C          ZERO = 0.0
50           NLISTD = 14
51           NELEM0 = 400
52           CALL DVALUE (VAR
53           IVAR( 1) = 1
54           IVAR( 2) = 10
55           IVAR( 3) = 4
56           IVAR( 4) = 7
57
58

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OPT=1

RCDDEN

SUBROUTINE

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)			
MODD	8041	6 K1OT1 (1) 0 B (3200) 8000 OMG (40) O FMACH (1) 32 RYBO (15) O QMWT (200) O LC (40) O ITAPES (50)	7 K2OT2P (1) 3200 DETAD (3200) 8040 NC (1) 1 BETA (1) 47 NRVBD (1) 200 QWT (5) 40 CR (1)	8 E2 (1) 6400 WW (1600)	
FLUTAN	48			2 VBO (30)	
FLUTQ	205				
COMA	41				
CTAPES	50				
COMRWP	3	O ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)	
CTS HF	2	O LTSHF (1)	1 TSHF (1)	2 LINES (1)	
CLIST	11	O KOUNT (1)	1 KPAGE (1)	5 KTPAGE (1)	
		3 LINEST (1)	4 KLABEL (1)	8 LINESG (1)	
		6 NPAGE (1)	7 KBPAGE (1)		
		9 KOUNTH (1)	10 KOUNTI (1)		
C TABLE	8	O KTABLE (1)	1 NPASS (1)	2 NROWS (1)	
		3 NCOLS (1)	4 NCOLST (1)	5 KTABLO (1)	
		6 NPAGEA (1)	7 ITAPET (1)		
CFILES	51	O KFILES (1)	1 IFILEES (50)		
STATISTICS					
PROGRAM LENGTH		12506B	5446		
CM LABELED COMMON LENGTH		37241B	16033		
52000B CM USED					

SUBROUTINE RODDEN		74/74 OPT=1		DEF LINE REFERENCES		REFERENCES	
STATEMENT LABELS		DEF LINE		157	152	155	
213 42		157		156	152	155	
212 43		157		156	153		
234 46		169		169	165		
754 47	FMT	255	130	255	130		
236 48		171	168	171	168		
756 55	FMT	256	89	256	89		
0 109		86	85	86	85		
253 152		184	177	184	177		
450 160		246	161	246	161		
0 200		242	240	242	240		
0 202		243	239	243	239		
0 203		245	244	245	244		
312 450		207	217	207	217		
760 1000	FMT	257	106	257	106		
323 8000		210	198	210	198		
335 9002		218	209	218	209		
LOOPS	LABEL	INDEX		FROM-TO	LENGTH	PROPERTIES	
52 109	K			85 86	2B	INSTACK	
144	I			130 130	1B	EXT REFS	
214 160	J			161 246	237B	EXT REFS	NOT INNER
343 6	I			229 234	24B	INSTACK	NOT INNER
355 6	III			231 234	6B	INSTACK	NOT INNER
426 202	I			239 243	21B	INSTACK	NOT INNER
415 200	II			240 242	7B	INSTACK	NOT INNER
430 203	I			244 245	20B	EXT REFS	NOT INNER
433	II			245 245	11B	EXT REFS	
COMMON BLOCKS	VARBLS	LENGTH		MEMBERS - BIAS NAME(LENGTH)			
		6014		O NCNSM1 (1)	1	NB (1)	
				3 NDATA (1)	4	NOPAN (1)	
				6 IR (1)	7	JSPECS (1)	
				58 NSARAY (50)	108	NBARAY (50)	
				159 B2 (1)	160	FL (1)	
				162 KR (1)	163	KRDBR (1)	
				214 X (400)	614	Y (400)	
				1414 Z1 (400)	1814	P1 (400)	
				2614 Z2 (400)	3014	P2 (400)	
				3814 EV (400)	4214	PV (400)	
				5014 SDELX (400)	5414	DELV (400)	
				5864 YO (50)	5914	Z0 (50)	
				O YS (50)	50	DELYS (50)	
				150 DELZS (50)	200	FGAMMA (50)	
				300 DUMMY (50)	50	X3A (50)	
				150 X1A (50)	200	X2A (50)	
				O XDC (400)	400	XIJ (50)	
				O CT1 (50)	50	CT2 (50)	
				O NTP1 (1)	1	NTP2 (1)	
				3 NTP4 (1)	4	NTP5 (1)	
				6 NTP7 (1)	7	NTP8 (1)	
				9 NTP10 (1)	100	ROP (100)	
				O RO (100)	220	BGMA (20)	
				BGMA (20)	300	YBO (20)	
				YBO (20)	320	ZBO (20)	
BODY	340				1	K20 (1)	
					2	K1RT1 (1)	
DLM	9				3	RTTND (1)	

VARIABLES	SN	TYPE	RELOCATION	
1 TSHF	REAL	ARRAY	CTSHF	
2 VBO	REAL	ARRAY	FLUTAN	
11350 WQ	COMPLEX	*UNDEF	REFS	REFS
14400 WW	REAL	ARRAY	MODD	REFS
326 X	REAL	ARRAY	VARBLS	REFS
430 XBO	REAL	ARRAY	BODY	REFS
620 XIJ	REAL	ARRAY	XXZ	REFS
0 XOC	REAL	ARRAY	XXZ	REFS
13266 XO	REAL	ARRAY	VARBLS	REFS
0 XIA	REAL	ARRAY	YZY	REFS
310 X2A	REAL	ARRAY	YZY	REFS
62 X3A	REAL	ARRAY	YZY	REFS
144 X5A	REAL	ARRAY	YZY	REFS
226 X7A	REAL	ARRAY	YZY	REFS
1146 Y	REAL	ARRAY	VARBLS	REFS
454 YBO	REAL	ARRAY	BODY	REFS
12310 YIN	REAL	ARRAY	YZY	REFS
0 YS	REAL	ARRAY	XYZ	REFS
13350 YO	REAL	ARRAY	VARBLS	REFS
500 ZBO	REAL	ARRAY	BODY	REFS
12372 ZIN	REAL	ARRAY	XYZ	REFS
144 ZS	REAL	ARRAY	XYZ	REFS
11006 ZV	REAL	ARRAY	VARBLS	REFS
1766 ZZ	REAL	ARRAY	VARBLS	REFS
4246 ZZ <sup>1</sup>	REAL	ARRAY	VARBLS	REFS
6526 ZZ2	REAL	ARRAY	VARBLS	REFS
13432 ZO	REAL	ARRAY	VARBLS	REFS
2606 Z1	REAL	ARRAY	VARBLS	REFS
5066 Z2	REAL	ARRAY	VARBLS	REFS
VARIABLES USED AS FILE NAMES.				SEE ABOVE
EXTERNALS		TYPE	ARGS	REFERENCES
BIDI		3	139	
DCLOSE		1	204	
FUTSOL		12	215	
GEDLAB		6	212	
GENF		20	222	
GENO		15	175	
GLOBAL		1	146	
MERGE		2	140	
MIDI		3	135	
PART1		5	122	107
PLB		3	105	
PROGNA		2	57	
PRT2		2	182	
PTABLE		3	112	116
PUDLAB		6	202	
QINTP		7	250	
QUAS		12	203	
TIMEB		2	123	
TITLES		1	104	

STATEMENT LABELS	DEF LINE	REFERENCES
455 2	261	247
167 5	141	136
0 6	234	229
753 7	254	231
FMT	RR	

SUBROUTINE	RODOEN	74/74	OPT=1	RELOCATION	VARIABLES	SN	TYPE	REFS	FTN 4.8+577	85/01/23.	08. 10. 44	PAGE	8
2 NDELT		INTEGER	REFS	18		222	DEFINED	89	149		162		
1057 NF		INTEGER	REFS	162		211	DEFINED	215	150		201		
1060 NFILE		INTEGER	REFS	201		202	DEFINED	203	185		193		
1067 NI		INTEGER	REFS	203		215	DEFINED	140	185		131		
1052 NM		INTEGER	REFS	135		139	DEFINED	216	222		DEFINED		
1021 NMD		INTEGER	REFS	175		206	DEFINED	18	190		81		
1065 NMIB		*	REFS	175		175	DEFINED	222	132		132		
1064 NMTP		*	REFS	175		175	DEFINED	101	81		81		
1073 NO		INTEGER	REFS	203		215	DEFINED	101	190		190		
4 NOPAN		INTEGER	REFS	18		18	DEFINED	89	89		89		
1025 NP		INTEGER	REFS	101		101	DEFINED	101	156		156		
6 NPAGE		INTEGER	REFS	44		44	DEFINED	44	154		154		
6 NPAGEA		INTEGER	REFS	46		46	DEFINED	46	129		129		
1 NPASS		INTEGER	REFS	135		139	DEFINED	175	151		151		
1053 NPOINT		INTEGER	REFS	203		215	DEFINED	109	114		114		
1045 NPR1		INT, *ER	REFS	161		175	DEFINED	154	125		125		
1061 NRF		INTEGER	REFS	46		46	DEFINED	250	129		129		
2 NROWS		INTEGER	REFS	38		154	DEFINED	18	129		129		
57 NRVBO		INTEGER	REFS	18		18	DEFINED	222	129		129		
72 NSARAY		INTEGER	REFS	130		139	DEFINED	135	140		140		
1042 NSTRIP		INTEGER	REFS	222		139	DEFINED	109	114		114		
1046 NSV		INTEGER	REFS	135		135	DEFINED	250	178		178		
1054 NTBX		INTEGER	REFS	222		128	DEFINED	60	1/O REFS		1/O REFS		
1044 NTOT		INTEGER	REFS	29		185	DEFINED	60	125		125		
0 NTP1		INTEGER	REFS	29		29	DEFINED	69	129		129		
11 NTP10		INTEGER	REFS	29		139	DEFINED	73	61		61		
1 NTP2		INTEGER	REFS	29		191	DEFINED	191	62		62		
2 NTP3		INTEGER	REFS	29		192	DEFINED	192	63		63		
3 NTP4		INTEGER	REFS	29		29	DEFINED	64	63		63		
4 NTP5		INTEGER	REFS	29		29	DEFINED	65	63		63		
5 NTP6		INTEGER	REFS	29		29	DEFINED	66	62		62		
6 NTP7		INTEGER	REFS	29		29	DEFINED	66	61		61		
7 NTP8		INTEGER	REFS	29		189	DEFINED	190	67		67		
10 NTP9		INTEGER	REFS	203		215	DEFINED	191	68		68		
1074 NW		INTEGER	REFS	182		182	DEFINED	129	191		191		
1050 NYAW		INTEGER	REFS	177		198	DEFINED	198	94		94		
1032 N1		INTEGER	REFS	100		100	DEFINED	89	89		89		
1027 N3		INTEGER	REFS	175		175	DEFINED	89	96		96		
1030 N4		INTEGER	REFS	175		175	DEFINED	89	97		97		
1033 N5		INTEGER	REFS	175		175	DEFINED	89	89		89		
1034 N6		INTEGER	REFS	175		175	DEFINED	11	37		37		
1031 N7		INTEGER	REFS	219		219	DEFINED	11	82		82		
17500 QMG		REAL	REFS	18		18	DEFINED	18	82		82		
241 PI		REAL	REFS	18		18	DEFINED	18	82		82		
10166 PV		ARRAY	REFS	18		18	DEFINED	18	82		82		
3426 P1		ARRAY	REFS	18		18	DEFINED	18	82		82		
5706 P2		ARRAY	REFS	18		18	DEFINED	18	82		82		
0 QMWT		REAL	REFS	7		7	DEFINED	39	241		241		
310 QWT		REAL	REFS	7		39	DEFINED	203	241		241		
1010 RHSTAP		INTEGER	REFS	195		195	DEFINED	215	192		192		
40 RVBO		REAL	REFS	8		38	DEFINED	166	250		250		
0 RO		REAL	REFS	30		30	DEFINED	237	99		99		
144 ROP		REAL	REFS	18		18	DEFINED	18	222		222		
1036 S		REAL	REFS	28		28	DEFINED	28	144		144		
11626 SDELX		REAL	REFS	144		144	DEFINED	144	TS		TS		

SUBROUTINE RODDEN		74/74	OPT=1	RTN 4.8+577		85/01/23 - 08.10.44		PAGE	7
VARIABLES	SN	TYPE	RELOCATION						
1 KPAGE	KQINT	INTEGER LOGICAL	CLIST	REFS	52	166	167	247	DEFINED
1011				REFS	78				76 77
242 KR	REAL		VARBL	DEFINED	18	34	172	222	2*238
243 KRDDBR	REAL		VARBL	REFS	166	167	169		
0 KTABLE	INTEGER		CTABLE	REFS	18	34	DEFINED	172	
5 KTABLO	INTEGER		CTABLE	REFS	46		DEFINED	111	115
5 KTPAGE	INTEGER		CLIST	REFS	44				
3 KIT1	REAL		DLM	REFS	33	36			
2 K1RT1	REAL		DLM	REFS	33	36			
0 K10	REAL		DLM	REFS	33	36			
6 K1OT1	REAL		DLM	REFS	33	36			
5 K2IT2P	REAL		DLM	REFS	33	36			
4 K2RT2P	REAL		DLM	REFS	33	36			
1 K20	REAL		DLM	REFS	33	36			
7 K2OT2P	REAL		DLM	REFS	33	36			
0 LC	INTEGER		ARRAY	COMA	9	40	77	78	96
				REFS	131	132	151	152	154
				REFS	250		2*153		2*165
1056 LC12	INTEGER		REFS	146	DEFINED	145			
1037 LC2	INTEGER		REFS	229	DEFINED	240	244	245	250
1102 LCB	INTEGER		DEFINED	102	REFS	237	238	235	236
11754 LIM	INTEGER		REFS	10	REFS	10	222	222	236
2 LINES	INTEGER		REFS	44	REFS	44	103	103	3*130
10 LINESG	INTEGER		REFS	44	REFS	44			
3 LINEST	INTEGER		REFS	44	REFS	44			
1014 LTAPE	INTEGER		REFS	202	DEFINED	70			
0 LTSHF	INTEGER		CTS HF	REFS	43				
1071 M	INTEGER		REFS	203	DEFINED	205	206	215	216
1020 MD	*	INTEGER	DEFINED	188	REFS	203			
1072 MM	INTEGER		DEFINED	80	REFS	250	72	1/O REFS	194
360 MRK	INTEGER		DEFINED	71	1/O REFS	74	228	54	245
1016 MTAP	INTEGER		REFS	16	REFS	16			
1015 MTAP16	INTEGER		REFS	202	DEFINED	202			
12454 NAMDOB	NAME		REFS	16	REFS	16			
12456 NAME	INTEGER		REFS	203	REFS	203			
1017 NAT	INTEGER		REFS	18	REFS	18			
1 NB	INTEGER		REFS	18	REFS	18			
154 NBARY	INTEGER		REFS	18	REFS	18			
1043 NBE	INTEGER		REFS	18	REFS	18			
310 NBODY	INTEGER		REFS	18	REFS	18			
1066 NBOX	INTEGER		REFS	18	REFS	18			
1041 NBV	INTEGER		REFS	128	REFS	128			
1047 NC	INTEGER		MODD	REFS	162	REFS	162	REFS	126
17550 NCARAY	INTEGER		REFS	37	REFS	37			127
10 NCARAY	INTEGER		REFS	18	REFS	18			
0 NCNSM1	INTEGER		REFS	18	REFS	18			
3 NCOLS	INTEGER		CTABLE	REFS	46	REFS	46	REFS	110
4 NCOLST	INTEGER		CTABLE	REFS	46	REFS	46	REFS	46
1026 NCORE	INTEGER		REFS	175	REFS	175	REFS	175	B9
1070 ND	INTEGER	TNTFGFR	REFS	203	REFS	203	REFS	203	187
2 NDATA			REFS	1A	REFS	1A	REFS	1A	100



SUBROUTINE RODDEN 74/74 OPT=1

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00 6 I=2,LC2          RODDEN 230
II= I-1              RODDEN 231
DO 6 III= 1,II        RODDEN 232
GENFM( I,III)= GENFM( I,III)  RODDEN 233
GENFM( I,III)= GENFM( I,III)  RODDEN 234
6 GENFM( III,I)= GENFM( III,I)  RODDEN 235
LCB = 0               RODDEN 236
IF (LC(1) EQ 2 OR LC(33) NE 0) LCB = 1  RODDEN 237
IF (LCB NE 0) ACON = -S/24  RODDEN 238
IF (LCB EQ 0) ACON = -(S/12)*(BR/12)/(KR*KR*2.)  RODDEN 239
DO 202 I = 1,LC2      RODDEN 240
 202 I= 1,LC2          RODDEN 241
  GENFM( I,II) = ACON * GENFM( I,II) * QMWT( II,1) * QWT( I,1)  RODDEN 242
 200 CONTINUE          RODDEN 243
 200 CONTINUE          RODDEN 244
 202 CONTINUE          RODDEN 245
  DO 203 I = 1,LC2    RODDEN 246
  203 WRITE (MTAP) (GENFM( I,II),II=1,LC2)  RODDEN 247
 160 CONTINUE          RODDEN 248
  IF ( .NOT. QINT ) GO TO 2  RODDEN 249
C   ***** QINTP *****
C   CALL QINTP (MTAP,LC2,LC(4),RVBO,NRVBO,FMACH,VBO)  RODDEN 250
C FORMATS             RODDEN 251
C FORMATS             RODDEN 252
C
C   20 FORMAT (4F10.0)  RODDEN 253
C   47 FORMAT (6(1X,3I3))  RODDEN 254
C   55 FORMAT (10I5)  RODDEN 255
C   1000 FORMAT (10X,51HSUBSONIC UNSTEADY AERODYNAMICS USING DOUBLET LATTIC  RODDEN 256
C   1          19HE PROCEDURE  RODDEN 257
C   2          ./10X,62(1H-) )  RODDEN 258
C   2 RETURN          RODDEN 259
C   END                RODDEN 260
 260

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CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

209 1 AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	RELOCATION	REFS	18	222	DEFINED	88
1 RODDEN	1	VARBLs	REFS	241	237	238	
VARIABLES	SN	TYPE	REFERENCES				
236 ACAP	REAL	REAL	REFS				
1103 ACON	REAL	COMPLEX	REFS	4			
7304 AUGM	B	COMPLEX	REFS	3			
0 B	REAL	*UNDEF ARRAY	REFS	3			
1 BETA		MODD FLUTAN	REFS	38			

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      C KDRBR = KR / BR
      C   **** GENQ **** NMD, NMTP, NMTC, NCORE,
      C   CALL GENQ(N4,N5,N6,NRF,JRF,NBE,
      1   KDD2,YIN,ZIN,COEFP,COEFB)
      C   IF (N1.EQ.1) GO TO 152
      C   REWIND NTP1
      C   NBODY = NB
      C   CALL PRT2 (NYAW,NBV)
      C   NB = NBODY
      152 CONTINUE
      C   NI = NTP1
      C   KD = 2000
      C   ND = NBOX
      C   M = O
      C   MM = NTP8
      C   NO = NTP9
      C   NW = NTP3
      C   RHSTAP=NTP4
      C   REWIND NI
      C   REWIND MM
      C   REWIND RHSTAP
      C   REWIND NAT
      C   IWHICH = 1
      C   IF (N1.NE.O) GO TO 8000
      C   **** QUAS ****
      C   NFILE = NFILE + 1
      C   CALL PUDLAB (BHRODDENO1,LTAPE,NAMDUB,NFILE,IRDU,JCDU)
      C   CALL QUAS (ND,M,KD,NI,MM,NO,NAT,NW,LTAPE,RHSTAP,NPR1,NFILE)
      C   CALL DCLOSE (LTAPE)
      C   IF (M.EQ.0) GO TO 8000
      C   IF (M.EQ.NMD) IWHICH=2
      450 CONTINUE
      C   REWIND NW
      C   GO TO (8000,9002),IWHICH
      8000 CONTINUE
      C   IFILES(LTAPE) = NF + 1
      C   CALL GEDLAB (BHRODDENO1,LTAPE,NAME,NF,IRD,JCD)
      C   **** FUTSOL ****
      C   CALL FUTSOL (ND,M,KD,NI,MM,NO,NAT,NW,LTAPE,NF,RHSTAP,NPR1)
      C   IF (M.EQ.NMD) IWHICH=2
      C   GO TO 450
      9002 CONTINUE
      C   IF (N7.EQ.0) GO TO 160
      C   **** GENF ****
      C   CALL GENF (NDELT,NB,NSTRIP,NBOY,NTOT,NBV,NSV,NMD,LIM,ACAP,FL,
      1   B2,EV,Y,ZZ,SDELX,XIJ,XOC,X,KR)
      C   TRANPOSE GEN AERO FORCES
      C   SCALE THE GEN AERO FORCES FROM AGARD CONVENTION TO THAT OF EIGM
      C   READ (MTAP16) GENFM
  
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SUBROUTINE	RODDEN	74/74	OPT=1	85/01/23. 08.10.44	PAGE
115	KTABLE * 2 CALL PTABLE (2,18,18 1 HPROCEDURE (RODDEN))				3
120	C BASIC DATA CALCULATIONS				
125	C CALL PART1(JCUM, COEFP, COEFF, YIN, ZIN) CALL TIMEB ('25,25HFROM RODDEN, AFTER PART1 ) NBOX = NCNSM1 NSTRIP=JCUM NBE = 0 IF (NB.NE.0) NBE=NBEA(NB) NTOI = NBOX.NBE READ (ITAPER,55) NSTrip, NPR1, JSPECS, NSV, NBV, NYAW READ (ITAPER,47) (LIM(I,1), LIM(I,2), LIM(I,3), I=1,NSTRIP) NM = LC(2) NMD = LC(2)				
130	C CALL MIDI (NM,NPOINT,NTBOX) IF (NB.EQ.0) GO TO 5				
135	C CALL BIDI (NM,NPOINT,NTBOX) CALL MERGE (NM,NTBOX) 5 CONTINUE				
140	C READ (ITAPER,55 ) KLUGLB LC12 = KLUGLB CALL GLOBAL (LC12)				
145	C REWIND MTAP NF = 0 NFILE = 0 NRF = LC(4) IF (LC(1) EQ -1) GO TO 42 IF (LC(1) EQ 2 OR LC(33) EQ 1) GO TO 43 IF (LC(13) EQ 1) NRF = NRVBD GO TO 42 43 NRF = 1 42 CONTINUE				
150	C ***** REDUCED FREQUENCY LOOP *****				
155	C DO 160 J=1,NRF NF = NF + 1 JRF = J IQ = 0 IF (LC(33) NE 0 OR LC(1) EQ 2) GOTO 46 IF (KQINT) KR = 1.0/RVBD(J) IF (.NOT.KQINT) KR= 1.0/VB0(J) GO TO 48				
160	C KR = 0 0 VB0(1) = 1.0 E+10 140 CONTINUE				
165	C *****				
170	C *****				

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SUBROUTINE RODDEN 74/74  OPT=1           FTN 4.8+577      85/01/23. 08.10.44      PAGE   2

      IRDU = 99999
      JCDU = 99999
      NTP1 = ITAPES(21)
      NTP2 = ITAPES(32)
      NTP3 = ITAPES(23)
      NTP4 = ITAPES(22)
      NTP5 = ITAPER
      NTP6 = ITAPEW
      NTP7 = ITAPES(33)
      NTP8 = ITAPES(28)
      NTP9 = ITAPES(29)
      NTP10 = ITAPES(30)
      LTAPE = ITAPES(31)
      MTAP16 = ITAPES(36)
      MTAP = ITAPES(50)
      NAT = NTP2
      REWIND MTAP16
      REWIND MTAP
      KQINT = .FALSE.
      IF (LC(1).NE.0) KQINT= .TRUE.
      IF (LC(1).EQ.-1) KQINT = .TRUE.
      IQ = 0
      MD = 0
      NMID = 0
      PI = 3.14159265
      KD = 8000
      K002 = 40000
      DO 109 K=1,50
      109 NBARAY(K)= 0
      C
      READ (ITAPER,20) FL, ACAP
      READ (ITAPER,55) NDELT, NP, NCORE, N3, N4, N7
      C   REFERENCE CHORD
      C   B2 = REFERENCE SEMI-SPAN
      ACAP = REFERENCE AREA
      B2 = 12
      N1 = LC(22)
      N5 = 0
      IF (LC(22).EQ.0) N5 = 1
      N6 = 1
      BR = 12 * CR
      S = B2
      NDATA= N3
      NOPAN= NP
      LC2 = LC(2)
      KOUNT = LINES
      CALL TITLES (2)
      CALL PLB (1,1,ITAPEW)
      WRITE (ITAPEW,1000)
      CALL PLB (1,1,ITAPEW)
      KOUNT = KOUNT + 4
      NROWS = 1
      NCOLS = 0
      KTABLE = 2
      CALL PTABLE (1,52,52)
1   HSUBSONIC UNSTEADY AERODYNAMICS USING DOUBLET LATTICE
      KPOINT = 1

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      RODDEN 59
      RODDEN 60
      RODDEN 61
      RODDEN 62
      RODDEN 63
      RODDEN 64
      RODDEN 65
      RODDEN 66
      RODDEN 67
      RODDEN 68
      RODDEN 69
      RODDEN 70
      RODDEN 71
      RODDEN 72
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      RODDEN 100
      RODDEN 101
      RODDEN 102
      RODDEN 103
      RODDEN 104
      RODDEN 105
      RODDEN 106
      RODDEN 107
      RODDEN 108
      RODDEN 109
      RODDEN 110
      RODDEN 111
      RODDEN 112
      RODDEN 113
      RODDEN 114
      RODDEN 115

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      535 CALL HEAD (LTSHF, TSHF, IROWS, JLIMIT)          PART1 230
      GO TO (536, 537, 538) KHEAD                  PART1 231
      536 WRITE (ITAPEW, 210) ILOOP, NCNSM1, JLIMIT    PART1 232
      CALL PLB (1, 1, ITAPEW)
      537 WRITE (ITAPEW, 172) JCL, ( PNU(JC), JC=JCL, JCU)
      IF (KRETUR .LT. 3) GO TO 535                  PART1 233
      C      545 CALL HEAD (LTSHF, TSHF, IROWS, JLIMIT)          PART1 234
      GO TO (546, 547, 548) KHEAD                  PART1 235
      546 WRITE (ITAPEW, 215) ILOOP, NCNSM1, JLIMIT    PART1 236
      CALL PLB (1, 1, ITAPEW)
      547 WRITE (ITAPEW, 172) JCL, ( ZEE(JC), JC=JCL, JCU)
      548 WRITE (ITAPEW, 172) JCL, ( XIU(JC), JC=JCL, JCU)
      IF (KRETUR .LT. 3) GO TO 545
      JCOUNT = J - JBEGIN - 1
      JCEND = J - 2
      C      JCU = JBEGIN - 1
      J3=1
      IR = -1
      KRETUR = -3
      555 CALL HEAD (LTSHF, TSHF, IROWS, JEND)          PART1 237
      GO TO (556, 557, 558) KHEAD                  PART1 238
      556 WRITE (ITAPEW, 390) ILOOP, JCOUNT            PART1 239
      CALL PLB (1, 1, ITAPEW)
      557 WRITE (ITAPEW, 172) J3, (XIU(JC), JC=JCL, JCU)
      558 WRITE (ITAPEW, 172) J3, (ZEE(L), ZEE(L))
      J3=J3+KOLUMN
      IF (KRETUR .LT. 3) GO TO 555
      C      JBEGIN = JBEGIN + (NS-1)
      NCN1 = NCEND - 1
      NSM1 = NSEND - 1
      DO 604 M = NCRUN, NCM1
      DO 604 N = NSRUN, NSM1
      J = M + NC * (N-1)
      J1 = M + (NC-1) * (N-1)           NSOFAR
      C *** INDEX J1 USED TO DISTINGUISH (NC BY NS) ARRAYS FROM (NC-1)X(NS-1)A-S
      C *** FINAL ARRAY SINGLE DIMENSION VALUES ARE STORED BY COLUMNS
      C      K = (M+1) + NC * (N-1)
      L = M + NC * N
      KL = (M+1) + NC * N
      X(J1)=(1 / 8.) * (ZETA(J) + 3. * ZETA(K) + 3. * ZETA(KL)+ZETA(L)) PART1 260
      Y(J1)= (1 / 2.) * (PNU(J) + PNU(L))
      Z(J1) = (ZEE(J)+ZEE(L))/2.
      XA(J1) = X(J1)
      YA(J1) = Y(J1)
      ZA(J1) = ZZ(J1)
      Z1(J1)=(3 / 4.)* ZETA(J) + (1. / 4.) * ZETA(K)
      Z2(J1)=(3 / 4.)* ZETA(J) + (1. / 4.) * ZETA(KL)
      P1(J1)= PNU(J)
      P2(J1)= PNU(L)
      Z21(J1)= ZEE(J)
      Z22(J1)= ZEE(L)
      EV(J1)=(Z1(J1)+Z2(J1))/2.
      PV(J1)=(P1(J1)+P2(J1))/2.
      ZV(1,1)= 77(1,1)
      270
      275
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      295

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SUBROUTINE PART1 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 6  
 PART1  
 DELY(J1)= ABS( P2(J1)- P1(J1))  
 DELZ(J1)= ABS(Z2(J1)-Z1(J1))  
 FNUM = ZETA(K) + ZETA(KL) - ZETA(J) - ZETA(L)  
 SDELX(J1)= FNUM / 2.  
 CONTINUE  
 J1 = JCUM + 1  
 J2 = JCUM + NSM1  
 M = NSOFAR + 1  
 N = NSOFAR + NCM1  
 KT = 0  
 JIX = 0  
 DO 620 J = J1,J2  
 JIX = JIX+1  
 KT = KT+1  
 KTP1 = KT+1  
 TS(J) = (TAU(KT)+TAU(KTP1))/2.0  
 DO 603 I=M,N  
 DELYS(I)= DELY(I)  
 VS(J) = Y(I)  
 DELZS(I)= DELZ(I)  
 ZS(J) = ZZ(I)  
 603 CWIG(J) = CWIG(J) + SDELX(I)  
 DO 610 IC= M, N  
 610 XOC(IC) = (EV(IC)-XI(J ))/CWIG(J )  
 M = N + 1  
 FGAMMA(J)=GMA(ILOOP)  
 FGGAM(J) = GGMA(ILoopP)  
 620 N = N + NCM1  
 JCUM = J2  
 C  
 J3=1  
 JCU = J1 - 1  
 IR = -1  
 KRETUR = -3  
 605 CALL HEAD (LTSHF, TSHF, IRDWS, JCUM )  
 GO TO (606, 607, 608), KHEAD  
 606 WRITE(ITAPEW,330)ILOOP,NSM1  
 607 CALL PLB (1,1,ITAPEW)  
 608 WRITE(ITAPEW,172)J3, (CWIG(JC),JC=JCL,JCU)  
 J3=J3+KOLUMN  
 IF (KRETUR .LT. 3) GO TO 605  
 C  
 630 NSOFAR = NSOFAR + NCNSM1  
 DO 640 JY = 1,NSOFAR  
 640 DEL(JY) = SQRT(DEL(JY)\*\*2 + DELZ(JY)\*\*2)  
 NBA = 0  
 DO 660 IX = 1,NOPAN  
 NBARAY(IX) = NBA +(NCARAY(IX)-1)\*(NSARAY(IX)-1)  
 660 NBA = NBARAY(IX)  
 IF (LC(37) .EQ. 0) GOTO 11  
 C  
 KSAVE = KOLUMN  
 KOLUMN = KOLUMN\*3  
 KRETUR = -1  
 615 CALL HEAD (LTSHF, TSHF, IRDWS, NOPAN )  
 GO TO (616, 617, 618), KHEAD  
 C  
 340

SUBROUTINE PART1      74/74      OPT=1      FTN 4.8+577      85/01/23. 08.10.44      PAGE 7

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    617 CALL PLB (1,1,ITAPEW)
    618 WRITE (ITAPEW,173) JCL, (INBARAY(JC), JC=JCL,JCU)
    IF (KRETUR .LT. 3) GO TO 615
      KOLUMN = KSAVE
      C
      625 CALL HEAD (LTSHF, IROWS, NOPAN )
      GO TO (626, 627, 628), KHEAD
    626 WRITE (ITAPEW,110) NOPAN
    627 CALL PLB (1,1,ITAPEW)
    628 WRITE (ITAPEW,172) JCL, ( GMAS(JC), JC=JCL,JCU)
      IF (KRETUR .LT. 3) GO TO 625
      C
      11 CONTINUE
        JLIMIT = NSOFAR
        NCNSM1 = NSOFAR
      C
        IF (LC(37) EQ. 0) GOTO 12
        LSUB = 20
        IF (KOUNT .GT. (LINES-LSUB)) KOUNT = LINES
        CALL TITLES (2)
        KOUNT = KOUNT + LSUB
        CALL PLB (1,1,ITAPEW)
        WRITE (ITAPEW,220) JLIMIT
        CALL PLB (1,1,ITAPEW)
      C
        LSUB = 5
        IROWS = JLIMIT
        JCOLS = NLISTD + 1
        KRETUR = 0
      635 CALL HEAD (LTSHF, IROWS, JCOLS )
      GO TO (636, 637, 638), KHEAD
    636 WRITE (ITAPEW,1000)
    637 CALL PLB (1,1,ITAPEW)
        WRITE (ITAPEW,1001) (JC, JC=JCL,JCU)
      638 CONTINUE
        IF (JCU .LT. JCOLS)
          1WRITE (ITAPEW,1002) IR, (IVAR(IR,IVAR(JC)), JC=JCL,JCU)
        JCU1 = JCU - 1
        JCU2 = JCU - 2
        IF (JCU1 EQ. JCOLS)
          1WRITE (ITAPEW,1002) IR, (IVAR(IR,IVAR(JC)), JC=JCL,JCU2), XDC(IR)
          2 WRITE (IR,IVAR(JCU1))
      385 IF (KRETUR .LT. 3) GO TO 635
      C
      12 CONTINUE
      C
        IF (NB .EQ. 0) GO TO 910
      390 C INPUT BODY GEOMETRY
        IY = 0
        NBOX = JLIMIT
        I = 0
        IP1 = 0
        KCUM = 0
      395 JL1 = NBOX+1
        KL1 = NBOX+1
        DO 908 K=1,NB
          DO 909 I=1,NB
            VPO(V) = VPO(V) * RPO(K)
  
```

SUBROUTINE PART 1 74/74 OPT=1

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400      READ (ITAPER,35) ZSC,YSC,NF,NZ,NY,COEFF,MRK(K,1),MRK(K,2)
        WRITE (ITAPEW,45) K, YSC, ZSC, NY, NZ, COEFF,MRK(K,1),MRK(K,2)
        NFM1 = NF - 1
        READ (ITAPER, 100) (F(I), I = 1,NF)
        READ (ITAPER, 10) (RAD(I),I = 1,NF)
        WRITE (ITAPEW, 115) NF, K
        WRITE (ITAPEW, 170) ( F(I), I = 1,NF)
        WRITE (ITAPEW, 125) NF, K
        WRITE (ITAPEW, 170) (RAD(I), I = 1,NF)
        BGMA(K) = 0.0
        IF (NY.NE.0) BGMA(K) = -PI/2.0
        IF (NZ.NE.0.AND.NY.NE.0) BGMA(K) = 0.0
        COEFFB(K) = COEFF
        I = 0
        IP1 = 0
        JL2 = JL1 + NFM1 - 1
        KL2 = JL2
        DO 900 J=JL1,JL2
        KF = J-NBOX
        I = I+1
        IP1 = I+1
        X(J) = 0.5*(F(I) + F(IP1))
        XA(J) = X(J)
        EV(J)= X(J)
        Y(J) = YSC
        YA(J) = Y(J)
        PV(J)= YSC
        ZZ(J)= ZSC
        ZA(J) = ZZ(J)
        ZV(J)= ZSC
        SDEIX(J) = ABS(F(IP1)-F(I))
        DELY(J) = 0.5*(RAD(I) + RAD(IP1))
        ROKF = DELY(J)
        ROP(KF) = (RAD(IP1) - RAD(I))/SDEIX(J)
        900 CONTINUE
        JL1 = JL2+1
        KCUM = KCUM + NFM1
        NBEA(K) = KCUM
        908 CONTINUE
        WRITE (ITAPEW, 135) KCUM
        WRITE (ITAPEW, 170) (X( KL), KL=KL1,KL2)
        WRITE (ITAPEW, 145) KCUM
        WRITE (ITAPEW, 170) (EV(KL), KL=KL1,KL2)
        WRITE (ITAPEW, 155) KCUM
        WRITE (ITAPEW, 170) (Y( KL), KL=KL1,KL2)
        WRITE (ITAPEW, 165) KCUM
        WRITE (ITAPEW, 170) (ZZ(KL), KL=KL1,KL2)
        WRITE (ITAPEW, 175) KCUM
        WRITE (ITAPEW, 170) (SDELX(KL), KL=KL1,KL2)
        WRITE (ITAPEW, 185) KCUM
        WRITE (ITAPEW, 170) (DELY(KL), KL=KL1,KL2)
        WRITE (ITAPEW, 195) KCUM
        WRITE (ITAPEW, 170) (ROP(KF), KF = 1, KCUM)
        WRITE (ITAPEW, 430)
        910 CONTINUE
        NCNSM1 = JLIMIT
        435

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SUBROUTINE PART 1

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C FORMATS

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C          10 FORMAT (6F10.0)
C          25 FORMAT (2F10.0,1X,2I3,3X,F10.0)
30 FORMAT (1 10X,9HXCAP(1) = ,F10.5,1H,,2X,9HYCAP(1) = ,F10.5,1H,,2X,7HNC
A,I3,/
      2,10X,9HXCAP(2) = ,F10.5,1H,,2X,9HYCAP(2) = ,F10.5,1H,,2X,7HNS
B,I3,/
      3,10X,9HXCAP(3) = ,F10.5,1H,,2X,9HZCAP(1) = ,F10.5,1H,,2X,7HNDLT
C,I3,/
      4,10X,9HXCAP(4) = ,F10.5,1H,,2X,9HZCAP(2) = ,F10.5,1H,,2X,7HNOPAN
5,I3)
35 FORMAT (2F10.0,1X,3I2,3X,F10.0,2I3)
40 FORMAT (10X,21HREFERENCE CHORD = F10.5,2X,2HIN
1     ./,10X,21HREFERENCE SEMI-SPAN = F10.5,2X,2HIN
2     ./,10X,21HREFERENCE AREA = F10.5,2X,5HIN**2
3     ./,10X,21HMACH NUMBER = F10.5,
4     ./,10X,21HBETA = F10.5 )
45 FORMAT (1HO,25X,12H** BODY NO.,14,18H INPUT VALUES ***//,15X,
1 32HCENTER OF BODY COORDINATES Y = ,F16.6,5X,3HZ = ,F16.6//15X,
2 7HYFLAG = ,13, 9H ZFLAG = ,13,10X, 24HMODE SHAPE COEFFICIENT =
3 F16.6//15X,17HBODY BOX LIMITS =,2I5//)
60 FORMAT (10X,22HINPUT VALUES FOR PANEL,15)
80 FORMAT (10X,33HNUMBER OF ELEMENTS FOR ALL PANELS )
110 FORMAT (10X,14,23HDIHEDRAL ANGLES FOR ALL PANELS )
115 FORMAT (1HO,40X,14,27H BODY ELEMENTS FOR BODY NO., 14/)
120 FORMAT (10X, 5HPANEL,14,2X,3HHAS,14,22HZEE ELEMENTS - ZEE(1) )
125 FORMAT (1HO,42X,14,25H BODY RADII FOR BODY NO., 14/)
135 FORMAT (1HO,45X,14,28H X ELEMENTS FOR ALL BODIES//)
145 FORMAT (1HO,45X,14,28H XIV ELEMENTS FOR ALL BODIES//)
155 FORMAT (1HO,45X,14,28H Y ELEMENTS FOR ALL BODIES//)
165 FORMAT (1HO,45X,14,28H Z ELEMENTS FOR ALL BODIES//)
170 FORMAT (1HO,6E20.8)
172 FORMAT (10X,15, 1PBE14.6 )
173 FORMAT (10X, 15, 24I4)
175 FORMAT (1HO,45X,14,28H DX ELEMENTS FOR ALL BODIES//)
180 FORMAT (10X, 5HPANEL,14,2X,3HHAS,14,28H CHORDWISE DIVISIONS - TH(I
1))
185 FORMAT (1HO,45X,14,28H RAD ELEMENTS FOR ALL BODIES//)
190 FORMAT (10X, 5HPANEL,14,2X,3HHAS,14,28H SPANWISE DIVISIONS - TAU(I
1))
195 FORMAT (1HO,45X,14,30H X-DERIV OF RAD FOR ALL BODIES//)
200 FORMAT (10X,5HPANEL,14,5H HAS,14,15H ELEMENTS WITH,14,
1 10H VERTICES.,/10X,40HTHE X COORDINATES OF THESE VERTICES ARE ) PART 1
210 FORMAT (10X,5HPANEL,14,5H HAS,14,15H ELEMENTS WITH,14,
1 10H VERTICES.,/10X,40HTHE Y COORDINATES OF THESE VERTICES ARE ) PART 1
215 FORMAT (10X,5HPANEL,14,5H HAS,14,15H ELEMENTS WITH,14,
1 10H VERTICES.,/10X,40HTHE Z COORDINATES OF THESE VERTICES ARE ) PART 1
220 FORMAT (10X,50HTHE FOLLOWING FIFTEEN VARIABLES ARE LISTED IN COLU
X   ,22HMN FORMAT AND CONTAIN
Y   ./,10X,17HTHE SAME NUMBER (,13,10H) OF ITEMS
1   ./,10X,50HCOLUMN 1, X ELEMENTS FOR ALL PANELS - X(I)
2   ./,10X,50HCOLUMN 2, XI-V ELEMENTS FOR ALL PANELS - EV(I)
3   ./,10X,50HCOLUMN 3, XI-1 ELEMENTS FOR ALL PANE S - 21(I)
4   ./,10Y 50HCOLUMN 4 YT-2 F1MFMTS FOR A1 PANFI S - 72(T)

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5      ./,10X,50HCOLUMN 5. Y ELEMENTS FOR ALL PANELS - V(I)          PART1 515
6      ./,10X,50HCOLUMN 6. ETAV ELEMENTS FOR ALL PANELS PV(I)        PART1 516
7      ./,10X,50HCOLUMN 7. ETA1 ELEMENTS FOR ALL PANELS - P1(I)       PART1 517
8      ./,10X,50HCOLUMN 8. ETA2 ELEMENTS FOR ALL PANELS - P2(I)       PART1 518
9      ./,10X,50HCOLUMN 9. Z ELEMENTS FOR ALL PANELS - ZZ(I)          PART1 519
A      ./,10X,50HCOLUMN 10. Z-V ELEMENTS FOR ALL PANELS - ZV(I)         PART1 520
B      ./,10X,50HCOLUMN 11. Z-1 ELEMENTS FOR ALL PANELS - Z21(I)        PART1 521
C      ./,10X,50HCOLUMN 12. Z-2 ELEMENTS FOR ALL PANELS - Z22(I)        PART1 522
D      ./,10X,51HCOLUMN 13. SDEIX ELEMENTS FOR ALL PANELS - SDEIX(I)    PART1 523
E      ./,10X,50HCOLUMN 14. XOC ELEMENTS FOR ALL PANELS - XOC(I)        PART1 524
F      ./,10X,50HCOLUMN 15. BOX WIDTHS FOR ALL PANELS - DELY(I)        PART1 525
330 FORMAT (10X, SHPANEL,14,2X,3HHAS,14,2X,22HC,WIGGLES - CWIG(I), )  PART1 526
350 FORMAT (10X,51HTHE FOLLOWING FIVE VARIABLES ARE LISTED IN COLUMN F) PART1 527
X      ./,10X,17HFORMAT AND CONTAIN                                         PART1 528
Y      ./,10X,17HTHE SAME NUMBER (.I3, 1OH) OF ITEMS                      PART1 529
1      ./,10X,4,1HCOLUMN 1. Y-S FOR ALL STRIPS, YS(I)                   PART1 530
2      ./,10X,4,1HCOLUMN 2. DELY-S FOR ALL STRIPS, DELYS(I)             PART1 531
3      ./,10X,4,1HCOLUMN 3. Z-S FOR ALL STRIPS, ZS(I)                   PART1 532
4      ./,10X,4,1HCOLUMN 4. DELZ-S FOR ALL STRIPS, DELZS(I)             PART1 533
5      ./,10X,4,1HCOLUMN 5. T-S FOR ALL STRIPS, TS(I)                   PART1 534
390 FORMAT (10X, SHPANEL,14,2X,3HHAS,14,2X,22HXI-J ELEMENTS - XI(J,I)) PART1 535
430 FORMAT (10X,38HEND OF PART1 - BASIC DATA CALCULATIONS )           PART1 536
1000 FORMAT (10X,61HBASIC GEOMETRIC DATA ASSOCIATED WITH ALL AERODYNAMI PART1 537
1001 FORMAT (10X,1X,4H ROW,2X,5HCOL =,1( 1I3,1X, 3(1H-))            PART1 538
1      .,1( 1I4,1X, 9(1H-)))                                         PART1 539
1002 FORMAT (10X, I5, 1P8E14. 6)                                         PART1 540
2000 FORMAT (10X,51
1      HSURFACE AND BODY GEOMETRY AND ASSOCIATED PARAMETERS             PART1 541
2      ./,10X,51(1H-))                                                 PART1 542
C      RETURN END                                                       PART1 543
545

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#### CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

157	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
167	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
223	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
230	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
237	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
250	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
321	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
341	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
349	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
373	I	AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

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ENTRY POINTS 3 PART1 DEF LINE 1 REFERENCES 545

VARIABLES	SN	TYPE	RELOCATION	REFERENCES
236 ACAP	REAL	REAL	VARBLS	REFS 10 111
3205 ATANA	REAL	REAL	FLUTAN	REFS 176 177
1 BETA	REAL	REAL	BODY	REFS 20 111
334 BGMA	REAL	REAL	COMA	REFS 30 DEFINED 409
50 BR	REAL	REAL	VARBLS	REFS 32 110
237 B2	REAL	REAL	VARBLS	REFS 10 411
3202 COEFF	REAL	REAL	ARRAY	F. P.
0 COEFF	REAL	REAL	ARRAY	REFS 204 DEFINED 172
3170 COEFF	REAL	REAL	ARRAY	REFS 26 DEFINED 1
0 COEFP	REAL	REAL	ARRAY	REFS 126 127
O CT1	REAL	REAL	ARRAY	REFS 401 412
62 CT2	REAL	REAL	ARRAY	REFS 19 DEFINED 127
372 CWIG	REAL	REAL	ARRAY	REFS 19 DEFINED 125
12446 DELY	REAL	REAL	ARRAY	REFS 16 DEFINED 400
62 DELYS	REAL	REAL	ARRAY	REFS 16 DEFINED 133
6024 DELZ	REAL	REAL	ARRAY	REFS 19 DEFINED 134
226 DELZS	REAL	REAL	ARRAY	REFS 16 DEFINED 84
3211 DEL1	REAL	REAL	ARRAY	REFS 10 307
3210 DIFF21	REAL	REAL	XYZ	REFS 309 DEFINED 307
3207 DIFF31	REAL	REAL	XYZ	REFS 303 DEFINED 306
EV	REAL	REAL	ARRAY	REFS 24 305
7346 F	REAL	REAL	ARRAY	REFS 16 DEFINED 89
6726 F GAMMA	REAL	REAL	ARRAY	REFS 204 DEFINED 185
3110 FGGAM	REAL	REAL	ARRAY	REFS 185 DEFINED 184
454 FL	REAL	REAL	XYZ	REFS 204 DEFINED 183
240 FMACH	REAL	REAL	ARRAY	REFS 10 309
0 FNUM	REAL	REAL	XYZ	REFS 26 406
3234 FOUR	REAL	REAL	ARRAY	REFS 16 DEFINED 442
3206 FGGMA	REAL	REAL	ARRAY	REFS 204 DEFINED 2*430
13514 GGMAS	REAL	REAL	XYZ	REFS 305 DEFINED 311
3165 GMMAS	REAL	REAL	ARRAY	REFS 10 283
244 GMA	REAL	REAL	ARRAY	REFS 16 DEFINED 76
3316 GMAS	REAL	REAL	ARRAY	REFS 204 DEFINED 403
3157 I	INTEGER	INTEGER	REFS 181 311	REFS 181 311
3241 IC	INTEGER	INTEGER	REFS 24 352	REFS 123 DEFINED 123
3164 ILOOP	INTEGER	INTEGER	REFS 72 73	REFS 75 76
3225 IPNC	INTEGER	INTEGER	REFS 80 81	REFS 86 87
3253 IP1	INTEGER	INTEGER	REFS 147 149	REFS 215 216
5 IQ	INTEGER	INTEGER	REFS 307 403	REFS 404 406
3 IR	INTEGER	INTEGER	REFS 430 431	REFS 71 77
6 IRD	INTEGER	INTEGER	REFS 420 413	REFS 215 216
			REFS 2*309 DEFINED 308	REFS 132 133
			REFS 119 126	REFS 127 134
			REFS 140 141	REFS 158 168
			REFS 224 231	REFS 238 251
			REFS 408 413	REFS 311 312
			REFS 118 DEFINED 433	REFS 433 DEFINED 394
			REFS 421 430	REFS 403 404
			REFS 10 2*378	REFS 154 164
			REFS 40 2*382	REFS 154 164
			REFS 318 319	REFS 312 322
			REFS 10	REFS 180 181

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VARIABLES	SN	TYPE	RELOCATION		
3200	ROWS	INTEGER			
3155	IAPER	INTEGER			
0	ITAPES	INTEGER			
7	ITAPET	INTEGER			
3156	ITAPEW	INTEGER			
3270	IVAR	INTEGER	ARRAY	CTAPES CTABLE	
3244	IX	INTEGER			
3251	IY	*	INTEGER		
3214	J	*	INTEGER		
3161	JBEGIN	INTEGER			
3201	JC	INTEGER			
4	JCL	INTEGER	CHEAD		
3246	JCOLS	INTEGER			
3226	JCOUNT	INTEGER			
5	JCU	INTEGER	CHEAD		
0	JCUM	INTEGER	F.P.		
3247	JCU1	INTEGER			
3250	JCU2	INTEGER			
3227	JEND	INTEGER			
3237	JIX	INTEGER			
3222	JLIMIT	INTEGER			
3255	JL1	INTEGER	VARBLs		
3265	JL2	INTEGER			
7	JSPECs	INTEGER			
3242	JY	INTEGER			
3233	J1	INTEGER			
3235	J2	INTEGER			
3230	J3	INTEGER			
3215	K	INTEGER			

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VARIABLES	SN	TYPE	RELOCATION					
REFS			DEFINED	166	222	236	249	320
340			REFS	348	372	369	147	149
DEFINED			REFS	68	1/O REFs	122	125	
399			REFS	400	403	404		
REFS			REFS	28	33	68		
REFS			REFS	37		69		
REFS			REFS	97		99		
225			REFS	232	239	252		
366			REFS	375		69	1/O REFs	
137			REFS	158		168	170	
233			REFS	238		240	251	
344			REFS	350		352	365	
401			REFS	405		406	407	
442			REFS	443		444	445	
450			REFS	451		452	453	
57			REFS	5		378	2*382	
65			REFS	57		58	59	
66			REFS	66		67	60	
3*333			REFS	391		334	DEFINED	
DEFINED			REFS	204		206	208	
REFS			REFS	271		273	277	
303			REFS	304		305	306	
418			REFS	421	2*422	423	424	
2*428			REFS	429		430	431	
DEFINED			REFS	188		213	217	
REFS			REFS	213		242	245	
REFS			REFS	160		170	226	
344			REFS	352		376	378	
226			REFS	233		240	253	
378			REFS	382		40	2*160	
			REFS	324	2*344	2*352	2*170	
			REFS	372		378	376	
			REFS	251		382	382	
			REFS	40	DEFINED	242	242	
			REFS	160		170	226	
			REFS	324		352	376	
			REFS	153		163	219	
			REFS	291	292	320	320	
			REFS	382	DEFINED	380	DEFINED	
			REFS	382		381	381	
			REFS	249	DEFINED	243	243	
			REFS	298	DEFINED	296	298	
			REFS	212		222	224	
			REFS	365		369	455	
			REFS	415		417	DEFINED	
			REFS	416		435	396	
			REFS	10			435	
			REFS	3*330	DEFINED	329		
			REFS	271		272	273	
			REFS	278	3*287	289	297	
			REFS	297		314	314	
			REFS	253		254	324	
			REFS	316		325	325	
			REFS	271		277	288	
			REFS	409		410	411	

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VARIABLES	SN	TYPE	RELOCATION	VARIABLES	SN	TYPE	RELOCATION	
7	KBPAGE	INTEGER	CLIST	3254	KCUM	INTEGER	CLIST	
3267	KF	INTEGER	CHEAD	0	KHEAD	INTEGER		
3217	KL	INTEGER		4	KLABEL	INTEGER	CLIST	
	3256	KL1	INTEGER		3266	KL2	INTEGER	
	2	KOLUMN	INTEGER		0	KOUNT	INTEGER	CHEAD
	11	KOUNTH	INTEGER		12	KOUNT1	INTEGER	CLIST
	1	KPAGE	INTEGER		1	KPAGE	REAL	CLIST
	242	KR	REAL		243	KRDBR	REAL	VARBL
	0	KREPOR	INTEGER		1	KRETUR	INTEGER	REPORT
	3245	KSAVE	INTEGER		3236	KT	INTEGER	CHEAD
	0	KTABLE	INTEGER		5	KTABLO	INTEGER	CTABL
	5	KTPAGE	INTEGER		5	KTP1	INTEGER	CTABL
	3240	L	INTEGER		3216	L	INTEGER	CLIST
	0	LC	INTEGER					
	3223	LIM1	INTEGER					
	3224	LIM2	INTEGER					
	2	LINES	INTEGER					
	10	LINE SG	INTEGER					
	3	LINEST	INTEGER					
	3163	LOOP	INTEGER					
	7	LSKIP	INTEGER					
	6	LSUB	INTEGER					
	0	LTSHF	INTEGER					
	3212	M	INTEGER					
	360	MRK	INTEGER					
	3213	N	INTEGER					
	1	NB	INTEGER					
		NPC	INTEGER					
		3212	NPX					

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268	398			
437	439	441	443	445
452	DEFINED	395	436	447
433	452	DEFINED	418	452
157	167	223	230	237
349	373			250
278	288	440	442	446
DEFINED	200	270	440	444
450				
442	444	446	448	450
442	444	446	448	450
254	325	337	338	
107	338	346		
95	100	112	120	135
95	100	112	120	36
				36
10				
10				
107				
161	171	227	234	241
353	385	DEFINED	155	165
339	371			22
DEFINED	337			
300	301	DEFINED	295	299
DEFINED	103			
DEFINED	300			
272	273	278	280	282
269				288
32	335	359		
219	DEFINED	211		
DEFINED	212			
2*95	2*361			
3*122	123	DEFINED	116	
DEFINED	151			
361	363	DEFINED	152	360
156	166	222	229	236
348	372			249
192	196	200	2*204	263
270	302	308	DEFINED	260
2*401	DEFINED	2*400		
192	196	200	204	205
268	269	270	302	308
187	261			310
389	398			313
				314
				315

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154	NBARAY	SN	TYPE	RELOCATION	REFS	10	334	344	DEFINED	333
310	NBEA		INTEGER	ARRAY	REFS	30	DEFINED	437		
3252	NBOX		INTEGER	ARRAY	REFS	396	397	418	DEFINED	392
3167	NC		INTEGER	ARRAY	REFS	137	139	140	DEFINED	147
					REFS	192	196	200	143	158
					REFS	268	269	270	214	262
10	NCARAY		INTEGER	ARRAY	REFS	10	333	333	DEFINED	125
3175	NCEND		INTEGER	ARRAY	REFS	156	186	258	DEFINED	140
3231	NCM1		INTEGER	ARRAY	REFS	260	294	313	DEFINED	143
O	NCNSM1		INTEGER	ARRAY	DEFINED	10	224	231	DEFINED	258
					REFS	139	357	455		328
3	NCOLS		INTEGER	C TABLE	REFS	37	DEFINED	102		
4	NCOLST		INTEGER	C TABLE	REFS	37				
3174	NCRUN		INTEGER	VARBL'S	REFS	153	186	260	DEFINED	142
3	NDATA		INTEGER	VARBL'S	REFS	10	137			
2	NDELT		INTEGER	VARBL'S	REFS	10	116	405	DEFINED	407
3154	NELEM'D		INTEGER	VARBL'S	REFS	53	DEFINED	52		408
3261	NF		INTEGER	CLIST	REFS	402	403	404		
				CTABLE	REFS	415	436	405		
3264	NFM1		INTEGER	CTABLE	REFS	53	DEFINED	402		
3153	NLSTD		INTEGER	CTABLE	REFS	10	137	51		
4	NOPAN		INTEGER	CTABLE	REFS	35				
6	NPAGE		INTEGER	CTABLE	REFS	37				
6	NPAGEA		INTEGER	CTABLE	REFS	37				
1	NPASS		INTEGER	CTABLE	REFS	37				
2	NROWS		INTEGER	FLUTAN	REFS	20				
57	NRVBO		INTEGER	FLUTAN	REFS	137	139	141	DEFINED	149
3166	NS		INTEGER	ARRAY	REFS	257	DEFINED	125		168
				VARBL'S	REFS	10	333	141		210
72	NSARAY		INTEGER	ARRAY	REFS	166	187	259	DEFINED	145
3177	NSEND		INTEGER	ARRAY	REFS	261	292	322	DEFINED	259
3232	NSM1		INTEGER	ARRAY	REFS	263	293	294	328	356
3160	NSOFAR		INTEGER	ARRAY	DEFINED	91	115	328		357
				VARBL'S	REFS	163	187	261		
3176	NSRUN		INTEGER	ARRAY	REFS	401	410	411	DEFINED	144
3263	NY		INTEGER	ARRAY	REFS	401	411	400	DEFINED	400
3262	NZ		INTEGER	ARRAY	REFS	10	123	179	180	410
241	P1		REAL	ARRAY	DEFINED	70	233	2*272	279	280
4220	P1"J		REAL	ARRAY	DEFINED	79	206	205		
				VARBL'S	REFS	206	DEFINED	284		
3220	PNUP		REAL	ARRAY	REFS	10	284	426		
10166	PV		REAL	ARRAY	REFS	10	284	286	DEFINED	279
3426	P1		REAL	ARRAY	REFS	10	284	286	DEFINED	280
5706	P2		REAL	ARRAY	REFS	10	284	286	DEFINED	280
6644	RAD		REAL	ARRAY	REFS	24	408	2*431	DEFINED	404
40	RVBO		REAL	ARRAY	REFS	20	23			
O	RO		REAL	ARRAY	REFS	30	DEFINED	432		
144	ROP		REAL	ARRAY	REFS	30	452	433		
11626	SDELX		REAL	ARRAY	REFS	10	307	448	DEFINED	289
3162	SMALL		REAL	ARRAY	REFS	175	DEFINED	114		430
5742	TAU		REAL	ARRAY	REFS	24	170	204	205	2*301
				FLUTAN	REFS	73	149			
				BODY	REFS	24	160	2*204	DEFINED	72
				BODY	REFS	19	301			147
5660	TH		REAL	ARRAY	REFS	6	34	156	DEFINED	222
144	TS		REAL	ARRAY	REFS	749	240	377		229
1	TSHF		REAL	ARRAY	REFS					236

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VARIABLES	SN	TYPE	RELOCATION	REFS	7	42	53	378	2*382
		REAL	ARRAY	REFS	20	23	274	422	423
	326	VBO	REAL	REFS	10	42	421	422	440
	2	X	REAL	DEFINED	271	421	DEFINED	274	422
	326	XOC	REAL	REFS	21	DEFINED	399	422	440
0	XA	REAL	ARRAY	REFS	30	DEFINED	399	422	440
430	XBO	REAL	ARRAY	REFS	24	128	2*133	2*134	4*182
3306	XCAP	REAL	ARRAY	DEFINED	4*124	253	309	DEFIN	216
620	XIJ	REAL	ARRAY	REFS	18	382	309	DEFIN	216
0	XOC	REAL	ARRAY	REFS	18	382	309	DEFIN	216
13266	XO	REAL	ARRAY	REFS	10	DEFINED	122	DEFIN	216
3171	X1	REAL	REAL	REFS	204	DEFINED	128	DEFIN	216
1146	Y	REAL	REAL	DEFINED	272	424	253	309	DEFIN
620	YA	REAL	ARRAY	REFS	21	DEFINED	275	425	444
454	YBO	REAL	ARRAY	REFS	30	DEFINED	399	425	444
3312	YCAP	REAL	ARRAY	REFS	24	129	2*137	2*173	DEFINED
3203	YDIF	REAL	ARRAY	REFS	175	176	205	DEFINED	173
0	YIN	REAL	ARRAY	REFS	27	DEFINED	1	130	130
0	YS	REAL	ARRAY	REFS	16	DEFINED	87	304	304
3260	YSC	REAL	REAL	REFS	401	424	426	DEFINED	400
13350	YO	REAL	REAL	REFS	10	DEFINED	122	DEFINED	173
3172	Y1	REAL	REAL	REFS	130	206	205	DEFINED	173
1440	ZA	REAL	REAL	REFS	21	DEFINED	276	428	428
500	ZBO	REAL	REAL	REFS	30	DEFINED	399	428	428
3314	ZCAP	REAL	REAL	REFS	24	131	2*137	2*174	DEFINED
3204	ZDIF	REAL	REAL	REFS	176	180	207	DEFINED	174
5040	ZEE	REAL	REAL	DEFINED	80	208	207	DEFINED	174
3221	ZEEP	REAL	REAL	REFS	132	208	207	DEFINED	174
3173	ZEE1	REAL	REAL	REFS	132	208	207	DEFINED	174
3152	ZERO	REAL	REAL	REFS	53	DEFINED	50	DEFINED	174
3400	ZETA	REAL	REAL	REFS	24	2*216	226	4*277	4*288
0	ZIN	REAL	ARRAY	DEFINED	78	204	204	2*277	4*288
144	ZS	REAL	ARRAY	REFS	27	DEFINED	1	132	132
3257	ZSC	REAL	REAL	REFS	16	DEFINED	88	306	306
11006	ZV	REAL	REAL	REFS	401	427	429	429	400
1766	ZZ	REAL	REAL	REFS	10	276	285	306	428
4246	ZZ1	REAL	ARRAY	DEFINED	273	427	287	DEFINED	282
6526	ZZ2	REAL	ARRAY	REFS	10	287	287	DEFINED	282
13432	Z0	REAL	ARRAY	REFS	10	287	287	DEFINED	282
2606	Z1	REAL	ARRAY	REFS	10	283	277	DEFINED	277
5066	Z2	REAL	ARRAY	REFS	10	283	277	DEFINED	277
			VARIABLES USED AS FILE NAMES. SEE ABOVE						
EXTERNALS		TYPE	ARGS	REFERENCES					
	ATAN3		3	176					
	DVALUE		3	53					
	HEAD		4	156	166	222	229	236	340
PLB			3	372					
PROGNA			2	97	99	113	121	136	169
PTABLE			3	239	252	323	343	351	366
SORT		REAL	1	LIBRARY	104	330			

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EXTERNALS TITLES	TYPE	ARGS	REFERENCES		16
		1	96	117	362
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES	
	REAL	1	INTRIN	175	
	INTEGER	2	SF	46	
STATEMENT LABELS			DEF LINE	REFERENCES	
2316 10	FMT	460	122	124	
1137 11		355	335		
1267 12		387	359		
2320 25	FMT	461	125		
2324 30	FMT	462	137		
2355 35	FMT	471	400		
2361 40	FMT	472	111		
2406 45	FMT	477	401		
2434 60	FMT	481	119		
2441 80	FMT	482	342		
2447 110	FMT	483	350		
2455 115	FMT	484	405		
2463 120	FMT	485			
2471 125	FMT	486	407		
2477 135	FMT	487	439		
2505 145	FMT	488	441		
2513 155	FMT	489	443		
2521 165	FMT	490	445		
2527 170	FMT	491	406		
2532 172	FMT	492	160		
2535 173	FMT	493	344		
2540 175	FMT	494	447		
2546 180	FMT	495	158		
2555 185	FMT	497	449		
2563 190	FMT	498	168		
2572 195	FMT	500	451		
2600 200	FMT	501	224		
2614 210	FMT	503	231		
2630 215	FMT	505	238		
2644 220	FMT	507	365		
3007 330	FMT	525	322		
3016 350	FMT	526			
3063 390	FMT	534	251		
3072 430	FMT	535	453		
0 450	INACTIVE	71			
0 460		76	71		
0 470		82	77		
0 480		84	83		
0 490		90	85		
23 <sup>a</sup> 505		156	161		
246 506		158	157		
250 507		159	157		
252 508		160	157		
266 515		166	171		
300 516		168	167		
302 517		169	167		
304 518		170	167		
437 525		222	227		
451 526		224	223		
453 527		225	223		

## STATEMENT LABELS

	DEF LINE	REFERENCES
455	528	226 223
466	535	229 234
500	536	231 230
502	537	232 230
504	538	233 230
332	540	179 175
515	545	236 241
527	546	238 237
531	547	239 237
533	548	240 237
336	550	181 178
553	555	249 255
565	556	251 250
567	557	252 250
571	558	253 250
0	560	209 186
0	570	217 214
0	603	307 302
0	604	290 260
773	605	320 326
1006	606	322 321
1010	607	323 321
1012	608	324 321
0	610	309 308
1057	615	340 345
1071	616	342 341
1073	617	343 341
1075	618	344 341
0	620	313 297
1110	625	348 353
1122	626	350 349
1124	627	351 349
1126	628	352 349
0	630	328 116
1164	635	372 385
1176	636	374 373
1200	637	375 373
1213	638	377 373
0	640	330 329
0	660	334 332
0	900	434 417
0	908	438 398
1532	910	454 389
3100	1000	536 374
3110	1001	538 376
3117	1002	540 378
3122	2000	541 98

## LOOPS LABEL INDEX

FROM-TO	LENGTH	PROPERTIES
71 76	4B	INSTACK
77 82	4B	INSTACK
1	83 84	INSTACK
1	85 90	INSTACK
LOOP M	116 328	6748 EXT REFS NOT INNER
	186 209	418 NOT INNER
	187 209	22B OPT

## FMT FMT FMT FMT

SUBROUTINE	PART 1	74/74	OPT = 1	FTN 4.8+577	85/01/23. 08 10.44	PAGE
LOOPS	LABEL	INDEX	FROM TO	LENGTH	PROPERTIES	18
612	604	M	260 290	738	NOT INNER	
624	604	N	261 290	558	OPT	
715	620	J	297 313	518	NOT INNER	
731	603	I	302 307	108	OPT	
750	610	IC	308 309	48	INSTACK	
1032	640	JY	329 330	78	INSTACK	
1045	660	IX	332 334	58	INSTACK	
1206	1221	JC	376 376	48	EXT REFS	
1244	JC	JC	378 378	128	EXT REFS	
1276	908	K	382 382	128	EXT REFS	
1401	900	J	398 438	1368	EXT REFS	
			417 434	238	OPT	
COMMON BLOCKS	LENGTH	MEMBERS	BIAS NAME(LENGTH)			
VARBLS	6014	O NCNSM <sub>1</sub> (1)	1	NB (1)	2 NDELT (1)	
		3 NDATA (1)	4 NOPAN (1)	5 IO (1)		
		6 IRD (1)	7 JSPECS (1)	8 NCARAY (50)		
		58 NSARAY (50)	108 NBARAY (50)	158 ACAP (1)		
		159 B2 (1)	160 FL (1)	161 P1 (1)		
		162 KR (1)	163 KRDDBR (1)	164 GMA (50)		
		214 X (400)	614 Y (400)	1014 ZZ (400)		
		1414 Z1 (400)	1814 P1 (400)	2214 ZZ1 (400)		
		2614 Z2 (400)	3014 P2 (400)	3414 ZZ2 (400)		
		3814 EV (400)	4214 PV (400)	4614 ZV (400)		
		5014 SDELEX (400)	5414 DELY (400)	5814 XO (50)		
		5864 YO (50)	5914 ZO (50)	5964 GGMA (50)		
XYZ	350	O YS (50)	50 DELYS (50)	100 ZS (50)		
		150 DELZS (50)	200 FGAMMA (50)	250 CWIG (50)		
		300 FGGAM (50)				
		O XOC (400)	400 XIJ (50)	100 TS (50)		
		O CT1 (50)	50 CT2 (50)	2 VBO (30)		
		O FMACH (50)	1 BETA (1)			
		32 RVBO (15)	47 NRVBO (1)			
		O XA (400)	400 YA (400)	800 ZA (400)		
		O RO (100)	100 ROP (100)	200 NBEA (20)		
		220 BGMA (20)	240 MRK (40)	280 XBO (20)		
		300 YBO (20)	320 ZBO (20)			
		O LC (40)	40 BR (1)			
		O ITAPES (50)				
		O LTSHF (1)	1 TSHF (1)			
		O KOUNT (1)	1 KPAGE (1)	2 LINES (1)		
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)		
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)		
		9 KOUNTH (1)	10 KOUNTI (1)			
		O KTABLE (1)	1 NPASS (1)	2 NROWS (1)		
		3 NCOLS (1)	4 NCOLST (1)	5 KTABLG (1)		
		6 NPAGEA (1)	7 ITAPET (1)			
REPORT	1	O KREPOR (1)	1 KRETUR (1)	2 KOLUMN (1)		
CHEAD	8	O KHEAD (1)	4 JCL (1)	5 JCU (1)		
		3 IR (1)	7 LSKIP (1)			
		6 LSUB (1)				
EQUITY CLASSES	LENGTH	MEMBERS	BIAS NAME(LENGTH)			
NCNSM <sub>1</sub>	5600	O VAR (5600)	400 Y (400)	800 ZZ (400)		
		1200 Z1 (400)	1600 P1 (400)	2000 Z21 (400)		
		2400 Z2 (400)	2800 P2 (400)	3200 Z22 (400)		
		3600 FV (400)	4000 PV (400)	4400 JV (400)		

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287 CALL PLB (1,1,ITAPEW)
KOUNT = KOUNT +4
KOUNTS = KOUNT
NROWS = 0
NCOLS = 2
KTABLE = 2
CALL PTABLE (2,58,TITLE)
100 CONTINUE
11 CALL RNRW (-MTAP16,A,LPT)

295 C SEARCH ALL NEW KNOWN POINTS. SELECTING THOSE WITH THE SAME Y AS
C THE PANEL IN QUESTION. THESE BECOME THE KNOWN POINTS CHORDWISE.
C

300 NSB = 0
R = 0.0
IU = 1
YU(1) = 0.0
DO 120 I = 1,NBOXS
MBOX = NTBOX + 1
YS = Y(MBOX)
IF (YS.EQ.R) GO TO 120
DO 301 NU = 1,IU
RU = YU(NU)
IF (YS.EQ.RU) GO TO 120
301 CONTINUE
IU = IU + 1
YU(IU) = YS
NSB = NSB + 1
R = YS
IF (.NOT. WILK )
DO 32 II = 1,NCF
IF (R.GE.Y1(II).AND.R.LE.Y2(II)) GO TO 36
32 CONTINUE
GO TO 120
36 NPT = 0
DO 5 J = 1,LPT
IF (YX(J).NE. R) GO TO 5
NPT = NPT + 1
XAT(NPT) = XX(J)
DEFL (NPT,1) = A(J)
5 CONTINUE
NGPI = NPT
NPL = MINO (4,NPT)

320 C SEARCH ALL PANELS. SELECTING THOSE WHERE Y=R. THESE BECOME THE
C UNKNOWNS CHORDWISE. NFB COUNTS THESE UNKNOWNS.
C

325 NFB = 0
DO 8 II = 1,NBOXS
J = NTBOX + II
IF ((Y(J).NE. R) GO TO 8
IF (.NOT. WILK ) GO TO 35
IF ((X(J).LT.XC(NSB)) GO TO 8
35 NFB = NFB + 1

330 C YY - RECEIVING POINT
C COUNTING .....

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```

230      DO 30 II= 1,NCF
          IF (YS GE Y1(II)) AND .YS.LE Y2(II)) GO TO 31
30      CONTINUE
          GO TO 876
31      NFP = NFP + 1
876      R = YS
          IF ( NFP EQ. 0 ) GO TO 875
              CALL HELGA (YY,AN,NFP,50,XAT,DEFL,NGPI,NGPL,50,0,0)
C
C      THE INTERPOLATION IS DONE; THE RESULTING DEFLECTIONS ARE AN.
C      NPT IS THE SUM OF NFP OVER ALL NLINES.
C      THESE POINTS NOW BECOME THE KNOWN POINTS. X'S ARE CALCULATED
C
          DO 6 LM = 1,NFP
              NPT = NPT + 1
              IF (M.GT.1) GO TO 7
              YX(NPT) = YY(LM)
              R = YX (NPT)
              XX(NPT) = XTERM1(KL) + (R-YTERM1(KL))*ZEL(KL)
7           A(NPT) = AN(LM,1)
              IF (ABS( A(NPT)) .LE. 1.OE-07) A(NPT) = 0.0
6           CONTINUE
875      CONTINUE
          LPT = NPT
          CALL RNRMW(MTAP16,A,LPT)
150      CONTINUE
          REWIND MTAP49
          REWIND MTAP16
C
C      CHORDWISE INTERPOLATION
C
          KDEG = NICH
          IF (KLNN .EQ. 0) GO TO 123
          CALL TITLES(2)
          CALL PLB (1,2,ITAPEW)
          WRITE (ITAPEW,4000)
          CALL PLB (1,1,ITAPEW)
          KOUNT = KOUNT + 5
          NROWS = 1
          NCOLS = 0
          KTABLE = 2
          CALL PTABLE (2,51,51)
1           HINTERPOLATED MODES FOR PRIMARY AND CONTROL SURFACES
123      CONTINUE
          DO 570 M=1,NMODES
              IF (KLNN .EQ. 0) GO TO 100
              REWIND ITAP18
              IF (KSURFT .EQ. 1) WRITE (ITAP18,2000) NSURF, M
              IF (KSURFT .EQ. 2) WRITE (ITAP18,2050) NSURF, M
              REWIND ITAP18
              READ (ITAP18,3000) TITLE
              IF ((LINE,KOUNT) .LT. 4) KOUNT = LINES
              CALL TITLES (2)
              CALL PLB (1,2,ITAPEW)
              IF (KSURFT .EQ. 1) WRITE (ITAPEW,2100) NSURF, M
              IF (KSURFT .EQ. 2) WRITE (ITAPEW,2150) NSURF, M
275      MODAL 230
                  MODAL 231
                  MODAL 232
                  MODAL 233
                  MODAL 234
                  MODAL 235
                  MODAL 236
                  MODAL 237
                  MODAL 238
                  MODAL 239
                  MODAL 240
                  MODAL 241
                  MODAL 242
                  MODAL 243
                  MODAL 244
                  MODAL 245
                  MODAL 246
                  MODAL 247
                  MODAL 248
                  MODAL 249
                  MODAL 250
                  MODAL 251
                  MODAL 252
                  MODAL 253
                  MODAL 254
                  MODAL 255
                  MODAL 256
                  MODAL 257
                  MODAL 258
                  MODAL 259
                  MODAL 260
                  MODAL 261
                  MODAL 262
                  MODAL 263
                  MODAL 264
                  MODAL 265
                  MODAL 266
                  MODAL 267
                  MODAL 268
                  MODAL 269
                  MODAL 270
                  MODAL 271
                  MODAL 272
                  MODAL 273
                  MODAL 274
                  MODAL 275
                  MODAL 276
                  MODAL 277
                  MODAL 278
                  MODAL 279
                  MODAL 280
                  MODAL 281
                  MODAL 282
                  MODAL 283
                  MODAL 284
                  MODAL 285
                  MODAL 286

```



SUBROUTINE MOOAL      74 / 74      OPT = 1

FTN 4, 8+577

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```

59      C READ IN 'LINES' DATA AND DETERMINE X + Y OF GIVEN POINTS: XGP, YGP
60      C B22 = B2*B2
61      READ (ITAPER, 83) NLINES, NELAXS, NICH, NISP
62      NGPTOT=0
63      DO 1082 I=1 NLINES
64      READ (ITAPER,62) NGP(I),XTERM1(I),YTERM1(I),XTERM2(I),YTERM2(I)
65      NGPTOT=NGPTOT + NGP(I)
66      NGP1=NGP(I)
67      DEL=(XTERM2(I)-XTERM1(I))/(YTERM2(I)-YTERM1(I))
68      MODAL
69      MODAL
70      YTM1 = YTERM1(I)
71      XTM1 = XTERM1(I)
72      READ (ITAPER,63)(YGP(J,I),J=1,NGPI)
73      YTM2 = YTERM2(I)
74      XTM2 = XTERM2(I)
75      DO 1083 JK = 1,NGPI
76      XGP(JK,I) = (YGP(JK,I) - YTM1)*DEL + XTM1
77      XGP1 = YGP(JK,I)
78      IF (XGP1.EQ.XTM2) XGP(JK,I) = XTM2
79      CONTINUE
80      C FORM CREATES A SECOND SET OF POINTS ON A LINE PARALLEL TO THE AE.
81      C KEL=0
82      IF (NELAXS.EQ.1) CALL FORM (NLINES,KEL,NGPTOT,NGP1,XGP,YGP,NGP)
83      NGP0=NGPTOT
84      C COUNT THE INTERSECTION OF TWO GIVEN LINES ONLY ONCE
85      C DO 77 K=1,NLIN
86      NGPL=NGP(K)
87      IF (XGP(NGPL,K) .EQ. XGP(1,K+1) .AND. YGP(NGPL,K) .EQ. YGP(1,K+1))
88      1 NGPO=NGPO-1
89      77 CONTINUE
90      C IF (NMPT.EQ.0) GO TO 2
91      WRITE (ITAPEW,400) NF
92      IF ( (WILK) ) WRITE (ITAPEW,50)
93      LINE = 9 + NGP(1)
94      IF ( (WILK) ) LINE = LINE + 16
95      WRITE (ITAPEW,70) NGPTOT,NLINES,NMNODES
96      2 CONTINUE
97      C CALCULATE SLOPES OF GIVEN LINES 'ZEL' AND PRINTOUT GIVEN POINTS.
98      C DO 1 I=1,NLINES
99      IF (NMPT.EQ.0) GO TO 3
100     IF ( I .EQ. 1 ) GO TO 13
101     LINE = LINE + 9 + NGP(I)
102     IF ( LINE .LT. 55 ) GO TO 13
103     LINE = 9 + NGP(I)
104     WRITE (ITAPEW,400) NF
105     IF ( (ITAPEW,51) 1,XTERM1(I),YTERM1(I),XTERM2(I),YTERM2(I))
106     WRITE (ITAPEW,52) NGP(I)
107     3 CONTINUE

```

SUBROUTINE MODAL 74/74 OPT=1

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PAGE 1

```

1      C      SUBROUTINE MODAL (NF,NMODES,ITAPE,WILK,NPOINT,NBOXX,NITBOX)      MODAL 2
1      C      INTEGER YES      MODAL 3
5      CIBM    DIMENSION TITLE(18)      MODAL 4
CIBM
CCDC    DIMENSION TITLE(8)      MODAL 5
10     CCDC    DIMENSION NGP(20)      XTERM1(20)      XTERM2(20)      MODAL 6
      DIMENSION XGP(12,20)      YTERM1(20)      YTERM2(20)      MODAL 7
      DIMENSION YGP(12,20)      A(400)      LL(50)      MODAL 8
      DIMENSION B(50)      ZEL(20)      YY(50)      MODAL 9
      DIMENSION DEF(12,20)      XAT(50)      DEFL(50,2)      MODAL 10
      DIMENSION AN(50,2),BQ(400),DH1(400),H(400),XX(400),YU(400),YX(400)      MODAL 11
      DIMENSION ITAPES(50)      MODAL 12
      DIMENSION QZ(220)      MODAL 13
      DIMENSION WW(40,40), OMG(40)      MODAL 14
20     C      LOGICAL WILK      MODAL 15
      C      COMPLEX C(40,40), DETAD(40,40)      MODAL 16
      C      COMMON /VARBLS / NCNSM1,NB,NDELT,NDATA,NOPAN,IQ,IR,JSPECs,      MODAL 17
      1      NCARY(50),NSRAY(50),NBARY(50),NBARY(50),B2,FL,PI,      MODAL 18
      2      KR,KROBR,GMA(50),X(400),Y(400),ZZ(400),Z1(400),      MODAL 19
      3      P1(400),ZZ1(400),Z2(400),P2(400),ZZ2(400),      MODAL 20
      4      EV(400),PV(400),ZV(400),SDELX(400),DELY(400),      MODAL 21
      5      XO(50),YO(50),ZO(50),GGMA(50)      MODAL 22
      COMMON /MODD / C, DETAD, WW, OMG, NC      MODAL 23
      COMMON /JUNK/XTERM1,XTERM2,YTERM1,YTERM2,DIST      MODAL 24
      COMMON /KMP/ NMPT, KLNK      MODAL 25
      COMMON /CNTRL/ X1(5), X2(5), Y1(5), Y2(5), XC(050), NCF      MODAL 26
      COMMON /CHSP/ KDEG      MODAL 27
      COMMON /COMRWP/ ITAPER, ITAPEP      MODAL 28
      COMMON /COMSTS/ NO ,YES      MODAL 29
      COMMON /CLIST/ COUNT ,KPAGE ,LINES ,LINEST ,KLABEL ,KTPAGE ,NPAGE      MODAL 30
      COMMON /KTPAGE/ LINESG ,KOUNT ,KOUNTI      MODAL 31
      COMMON /CTABLE/ KTABLE ,NPASS ,NROWS ,NCOLS ,NCOLST ,KTABLO ,NPAGEA      MODAL 32
      COMMON /CTAPES/ ITAPES      MODAL 33
      C      INITIAL CONDITIONS      MODAL 34
      C      CALL PROGNA (4H(MOD, 4HAL ))      MODAL 35
      NSURF = NF      MODAL 36
      KOUNT = LINES      MODAL 37
      IF (.NOT. WILK) KSURFT = 1      MODAL 38
      IF ( WILK) KSURFT = 2      MODAL 39
      ITAP18 = ITAPES(18)      MODAL 40
      MTAP16 = ITAPES(36)      MODAL 41
      REWIND MTAP16      MODAL 42
      MTAP49 = ITAPES(49)      MODAL 43
      C      C

```

SUBROUTINE MIDI		74/74 OPT=1		FTN 4 8+577		85/01/23 . 08.10.44	
VARIABLES	SN	TYPE	RELOCATION				
6526 222	REAL	ARRAY	VARBL\$	REFS	7		
13432 20	REAL	ARRAY	VARBL\$	REFS	7		
2606 21	REAL	ARRAY	VARBL\$	REFS	7		
5066 22	REAL	ARRAY	VARBL\$	REFS	7		
VARIABLES USED AS FILE NAMES, SEE ABOVE							
EXTERNALS	TYPE	ARGS	REFERENCES				
HELP		7	51	54			
MODAL		7	45	52			
RNRW		3	69	73			
STATEMENT LABELS		DEF LINE	REFERENCES				
0 1		57	38				
0 2	N	74	63				
0 3	J	73	64				
0 4	I	71	66	70			
0 5	FMT	78	76				
232 700		84	39				
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
26 1	I	38	57	55B	EXT REF\$		
104 2	N	63	74	26B	NOT INNER		
105 3	J	64	73	23B	EXT REF\$		
107 4	I	66	71	13B	NOT INNER		
133 5	I	76	78	7B	EXT REF\$		
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
VARBL\$	6014	O NCNSM1	(1)	1 NB	(1)		
		3 NDATA	(1)	4 NOPAN	(1)		
		6 IR	(1)	7 JSPECS	(1)		
		58 NSARAY	(50)	108 NBARRY	(50)		
		159 B2	(1)	160 FL	(1)		
		162 KR	(1)	163 KRD\$R	(1)		
		214 X	(400)	614 Y	(400)		
		1414 Z1	(400)	1814 P1	(400)		
		2614 Z2	(400)	3014 P2	(400)		
		3814 EV	(400)	4214 PV	(400)		
		5014 SDELX	(400)	5414 DELY	(400)		
		5864 YO	(50)	5914 ZO	(50)		
		0 LC	(40)	40 BR	(1)		
		O NMPT	(1)	1 KLNN	(1)		
		O ITAPES	(50)	O ITAPER	(1)		
COMA	41			1 ITAPEW	(1)		
KMP	2						
CTAPES	50						
COMRWP	3						
STATISTICS							
PROGRAM LENGTH				1147B	615		
CM LABELED COMMON LENGTH				13736B	6110		
520000 CM USED							

STATISTICS  
PROGRAM  
CM LABEL

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SUBROUTINE MIDI			74/74	OPT=1	RELOCATION	FTN 4 . 8+577	85/01/23.	08 . 10 . 44	PAGE	3
VARIABLES	SN	TYPE								
242	IBTAPE	INTEGER			VARBL\$	REFS	68	77	DEFINED	76
5	IQ	INTEGER			VARBL\$	REFS	42	53	DEFINED	25
6	IR	INTEGER				REFS	7			
244	ISTAPE	INTEGER				REFS	73	DEFINED	31	79
250	ITAPE	INTEGER				REFS	45	51	54	43
2	ITAPEP	INTEGER			CMWRWP	REFS	67	77	I/O REFS	33
0	ITAPER	INTEGER			CMWRWP	REFS	16	I/O REFS	42	78
0	ITAPES	INTEGER			CTAPES	REFS	6	15	DEFINED	56
1	ITAPEW	INTEGER			CMWRWP	REFS	16	23	DEFINED	25
252	J	INTEGER				REFS	70			31
253	JB	INTEGER				REFS	69	71	DEFINED	65
7	JSPECS	INTEGER			VARBL\$	REFS	72		DEFINED	71
1	KLNN	INTEGER			KMP	REFS	7			
242	KR	INTEGER			VARBL\$	REFS	14	DEFINED	29	
243	KRDBR	INTEGER			VARBL\$	REFS	7			
236	KSURF	LOGICAL				REFS	18	43	44	52
0	LC	INTEGER				REFS	5	13	28	
243	LC3	INTEGER				REFS	38	66	76	
240	MTAP15	INTEGER				REFS	52	DEFINED	23	
241	MTAP34	INTEGER				REFS	32	43	DEFINED	
251	N	* INTEGER				DEFINED	63			24
1	NB	INTEGER			VARBL\$	REFS	7	32		
154	NBARAY	INTEGER			VARBL\$	REFS	7			
246	NBOXS	INTEGER				REFS	40	45	49	
254	NBX	INTEGER			VARBL\$	REFS	17	68	49	
10	NCARAY	INTEGER			VARBL\$	REFS	7			
0	NCNSM1	INTEGER				REFS	7			
247	NCS	INTEGER				REFS	51	54	DEFINED	
3	NDATA	INTEGER				REFS	7			
2	NDLT	INTEGER				REFS	7			
0	NM	INTEGER			F.P.	REFS	45	51	52	
0	NMPT	INTEGER			KMP	DEFINED	4			
4	NOPAN	INTEGER			VARBL\$	REFS	14			
0	NPOINT	INTEGER			F.P.	REFS	7			
72	NSARAY	INTEGER			VARBL\$	REFS	45	52	DEFINED	
0	NTBOX	INTEGER			F.P.	REFS	7			
241	P1	REAL			VARBL\$	DEFINED	4			
10166	PV	REAL			VARBL\$	REFS	7			
3426	P1	REAL			VARBL\$	REFS	7			
5706	P2	REAL			VARBL\$	REFS	7			
11626	SDELX	REAL			VARBL\$	REFS	7			
237	WILK	LOGICAL			VARBL\$	REFS	18	45	52	
326	X	REAL			VARBL\$	REFS	7	26	55	
312	X1	REAL			VARBL\$	REFS	7			
13266	XO	REAL			VARBL\$	REFS	7			
1146	Y	REAL			VARBL\$	REFS	7			
13350	YO	REAL			VARBL\$	REFS	7			
11006	ZV	REAL			VARBL\$	REFS	7			
1766	ZZ	REAL			VARBL\$	REFS	7			

SUBROUTINE MIDI      74/74      OPT=1

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```

C
C PRINT MODE SHAPES (DEFLECTIONS AND SLOPES) IN DIGITAL FORMAT. ONE
C SURFACE AND ONE MODE PER PAGE.
C
DO 2 N = 1,NM
DO 3 J = 1,3
JB = 1
DO 4 I = 1,LC3
ITAPE = IBTAPE + I
NBOXS = NBX(I)
CALL RNRW (-ITAPE,XI(JB),NBOXS)
IF (J.EQ.1) GOTO 4
4 JB = JB + NBOXS
JB = JB - 1
3 CALL RNRW (ISTAPE,XI,JB)
2 CONTINUE
DO 5 I = 1,LC3
ITAPE = IBTAPE + I
5 REWIND ITAPE
REWIND ISTAPE
C
C FORMATS
C
700 FORMAT (L5.2I5)
C
80
C
85
C
RETURN
END

```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

70 1 4 THIS IF DEGENERATES INTO A SIMPLE TRANSFER TO THE LABEL INDICATED.

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINT 3 MIDI	DEF LINE 4	RELOCATION 86	REFERENCES
VARIABLES	SN TYPE	RELOCATION	REFERENCES
236 ACAP	REAL	VARBL\$	REFS 7
50 BR	REAL	COMA	REFS 13
237 B2	REAL	VARBL\$	REFS 7
12446 DELY	REAL	ARRAY	REFS 7
73446 EV	REAL	ARRAY	REFS 7
240 FL	REAL	VARBL\$	REFS 7
13514 GGMA	REAL	ARRAY	REFS 7
244 GMA	REAL	VARBL\$	REFS 7
245 I	INTEGER	VARBL\$	REFS 40 42 45 51 52 53 54

SUBROUTINE	MIDI	74/74	OPT=1	FTN 4.8+577	FTN 4.8+577	85/01/23. 08.10.44	PAGE
1	C	C	NMPT	LIST MODAL INPUT DATA			2
	C	C	NPOINT	LIST MODAL OUTPUT DATA			3
5	C	C	SUBROUTINE	MIDI (NM,NPOINT,NTBOX)			4
	C	C	DIMENSION	LC(40)			5
	C	C	DIMENSION	ITAPES(50)			6
	C	C	COMMON	/VARBLS / NCNSM1,NB_NDELT,NDATA,NOPAN,IQ,IR,JSPECs,			7
	1	C		NCARAY(50),NSARAY(50),NBARY(50),ACAP,B2,FL,PI,			8
	2	C		KR,KRDBR,GMA(50),X(400),Y(400),ZZ(400),21(400),			9
	3	C		P1(400),ZZ1(400),Z2(400),P2(400),ZZ2(400),			10
10	4	C		EV(400),PV(400),ZV(400),SDELX(400),DELY(400),			11
	5	C		XO(50),YO(50),ZO(50),GMA(50)			12
	C	C	COMMON	/ COMA / LC, BR			13
	C	C	COMMON	/KMP/ NMPT,KLNN			14
	C	C	COMMON	/ CTAPES / ITAPES			15
	C	C	COMMON	/CONRWP/ ITAPER,ITAPEN,ITAPEP			16
	C	C	DIMENSION	NBX(30), XI(400)			17
	C	C	LOGICAL	KSURF, WILK			18
	C	C	INITIAL CONDITIONS				19
	C	C	MTAP15	= ITAPES(35)			20
	C	C	MTAP34	= ITAPES(34)			21
	C	C	IBTAPE	= ITAPES(40)			22
	C	C	NTBOX	= O			23
	C	C	NPOINT	= 0			24
	C	C	NMPT	= LC(23)			25
	C	C	KLNN	= LC(24)			26
	C	C	LC3	= LC(3)			27
15	C	C	LC	= LC(27)			28
	C	C	ITAPE	= ITAPES(27)			29
	C	C	ISTAPE	= MTAP34			30
	C	C	REWIND	ITAPE			31
	C	C	ITAPE				32
	C	C	PRIMARY SURFACE LOOP				33
	C	C	DO	1 I = 1,LC3			34
	C	C	READ	(ITAPER,700) KSURF, NBOXS, NCS			35
	C	C	NBX(I)	= NBOXS			36
	C	C	WILK	= .FALSE.			37
	C	C	ITAPE	= IBTAPE + I			38
	C	C	IF	(KSURF) ITAPE = MTAP34			39
	C	C	IF	(KSURF) REWIND ITAPE			40
	C	C	CALL	MODAL (I,NM,ITAPE,WILK,NPOINT,NBOXS,NTBOX)			41
	C	C	**	NPOINT COUNTS THE GIVEN POINTS ON ALL SURF AND CONTROL SURF.			42
	C	C	**	NBOXS IS NUMBER OF BOXES ON ENTIRE SURFACE.			43
	C	C	**	NTBOX COUNTS THE BOXES FOR ALL SURFACES.			44
	C	C	IF	(KSURF) WILK = .TRUE.			45
	C	C	IF	(KSURF) REWIND MTAP15			46
	C	C	IF	(KSURF) CALL HELP (I,NM,NCS,NBOXS,NTBOX,ITAPE,1)			47
	C	C	IF	(KSURF) CALL MODAL (I,NM,MTAP15,WILK,NPOINT,NBOXS,NTBOX)			48
	C	C	ITAPE	= IBTAPE + I			49
	C	C	IF	(KSURF) CALL HELP (I,NM,NCS,NBOXS,NTBOX,ITAPE,2)			50
	C	C	NTBOX	= NTBOX + NBOXS			51
	C	C	REWIND	ITAPE			52
	C	C	CONTINUE				53

SUBROUTINE ATAN3      74/74      OPT=1  
STATISTICS  
PROGRAM LENGTH      66B      54  
520000B CM USED

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SUBROUTINE ATAN3    74/74    OPT=1

```

1      SUBROUTINE ATAN3(Y,X,T)
2      PI = 3.141593
3      PI2 = PI*2.0
4      IF(X.EQ.0.) T=PI/2.
5      IF(X.EQ.0.) GO TO 2
6      IF(Y.EQ.0.) T=0.
7      IF(Y.EQ.0.) GO TO 2
8      A = Y/X
9      T = ATAN(A)
10     2 CONTINUE
11     IF((Y.GE.0.) .AND. (X.EQ.0.)) GO TO 1
12     IF ((Y.EQ.0.) .AND. (X.GT.0.)) T=0.
13     IF ((Y.EQ.0.) .AND. (X.GT.0.)) GO TO 1
14     IF((Y.GE.0.) .AND. (X.LE.0.)) T = PI + T
15     IF((Y.GE.0.) .AND. (X.LE.0.)) GO TO 1
16     IF((Y.LE.0.) .AND. (X.LE.0.)) T = PI + T
17     IF((Y.LE.0.) .AND. (X.LE.0.)) GO TO 1
18     IF((Y.LE.0.) .AND. (X.LE.0.)) GO TO 1
19     IF((Y.LE.0.) .AND. (X.GE.0.)) T = PI2+ T
20     IF((Y.LE.0.) .AND. (X.GE.0.)) GO TO 1
21     1 CONTINUE
22     RETURN
23     END

```

CARD NR. SEVERITY DETAILS      DIAGNOSIS OF PROBLEM

19    I    1    THIS IF DEGENERATES INTO A SIMPLE TRANSFER TO THE LABEL INDICATED.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES			
3 ATAN3	1	21			
VARIABLES	SN	TYPE	RELOCATION		
65 A	REAL		REFS	9	DEFINED
63 PI	REAL		REFS	3	4
64 PI2	REAL		REFS	18	DEFINED
0 T	REAL	F.P.	REFS	14	16
0 X	REAL		REFS	12	14
0 Y	REAL	F.P.	REFS	4	5
EXTERNALS	TYPE	ARGS	REFERENCES		
ATAN	REAL	1 LIBRARY	9		
STATEMENT LABELS	DEF LINE	REFERENCES			
57 1	20	11	13	15	17
23 2	10	5	7		19

SUBROUTINE PART 1      74/74      OPT=1      FTN 4.8+577      85/01/23. 08.10.44      PAGE 19

EQUIV CLASSES      LENGTH      MEMBERS - BIAS NAME(LENGTH)  
                        4800 SDELY (400)      5200 DELY (400)

STATISTICS  
PROGRAM LENGTH      7033B      3611  
CM LABLED COMMON LENGTH      20741B      8673  
52000B CM USED

SUBROUTINE MODAL

74/74

OPT = 1

FTN 4.8+577

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        62 FORMAT(15.4E10.2)
        63 FORMAT(8E10.2)
        70 FORMAT (2X, 19HMODAL DATA GIVEN AT ,14, 1X, 9POINTS ON, I3, 1X,
         1      9HLINES FOR, I3,1X,5HMODES)
        92 F3MMAT (15X,14,10X,14,10X,E18.7)

        83 FORMAT(4I5)
        400 FORMAT(1H1, 19X, 15HSURFACE NUMBER ,13/)
        450 FORMAT (15X, 26HINPU, MODAL DATA FOR MODE , I3 //
         1      15X, 4HLINE, 10X, 5HPOINT, 15X, 10HDEFLECTION, //)
        2000 FORMAT ( ,44HINTERPOLATED MODES, PRIMARY SURFACES, SURF =,1I2
         1      , 9H, MODE =,1I3,12X)
        2050 FORMAT ( ,44HINTERPOLATED MODES, CONTROL SURFACES, SURF =,1I2
         1      , 9H, MODE =,1I3,12X)
        2100 FORMAT (10X, 44HINTERPOLATED MODES, PRIMARY SURFACES, SURF =,1I2
         1      , 9H, MODE =,1I3,/,10X,5B1H-)
        2150 FORMAT (10X, 44HINTERPOLATED MODES, CONTROL SURFACES, SURF =,1I2
         1      , 9H, MODE =,1I3,/,10X,5B1H-)
        2300 FORMAT (10X, 5H
         1      ,2X, 1,1H      X,2X, 1,1H      Y
         2      ,/,10X, 5HPOINT, 2X, 1,1H      H,2X, 1,1H      ALPHA
         3      ,3X, 1,1H      INCHES,2X, 1,1H      INCHES
         CIBM
         C3000 FORMAT (10X, 1I5,1P5E13.4)
         CIBM
         CIBM
         CCDC
         3000 FORMAT (7A10,1A2)
         CCDC
        4000 FORMAT (10X,5I
         1      HINTERPOLATED MODES FOR PRIMARY AND CONTROL SURFACES
         2      ,/,10X,5I(1H-))
        718 FORMAT (4X,I3,3X,E14.7,3X,E14.7)

C      RETURN
END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES			
3	2	433			
VARIABLES	SN	TYPE	RELOCATION		
2717 A		REAL	ARRAY	REFS	13 250 254 294 325
236 ACAP	REAL	REAL	VARBLS	DEFINED	249 250
4617 AN	REAL	REAL	ARRAY	REFS	16 237 249 349 354
3621 B	REAL	REAL	ARRAY	REFS	359 361 362 345 355
4763 BQ	REAL	REAL	ARRAY	REFS	14 349 384 345 358
237 B2	REAL	REAL	VARBLS	REFS	16 2*60 362
1645 B22	REAL	REAL	MODD	REFS	354 DEFINED 60
0 C	COMPLEX	ARRAY	MODD	REFS	23 31
4011 DEF	REAL	ARRAY	ARRAY	REFS	15 166 171 190 204

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VARIABLES	SN	TYPE					9
4453 DEFL	REAL	ARRAY		DEFINED REFS	147 15	150 237	164 349
1655 DEL	REAL	ARRAY	VARBL\$	DEFINED REFS	147 15	166 355	169 DEFINED
12446 DFLY	REAL	ARRAY	MOOD	REFS	147 25	354	67
≤200 DETAD	COMPLEX	ARRAY		REFS	147 23	3	1
5603 DH1	REAL	ARRAY	JUNK	REFS	147 16	379	386
120 DIST	REAL	ARRAY	VARBL\$	REFS	147 32	166	171
7346 EV	REAL	ARRAY	VARBL\$	REFS	147 25	345	
240 FL	REAL	ARRAY	VARBL\$	REFS	147 25	345	
13514 GGMA	GMA	REAL	VARBL\$	REFS	147 25	345	
244 GMA	REAL	REAL	VARBL\$	REFS	147 25	345	
6423 H	REAL	REAL	VARBL\$	REFS	147 25	345	
1653 I	INTEGER	INTEGER	VARBL\$	REFS	147 5*64	65	66
5 IQ	INTEGER	INTEGER	VARBL\$	REFS	147 71	72	75
6 IR	INTEGER	INTEGER	F.P.	REFS	147 5*112	113	5*115
0 ITAPEP	INTEGER	INTEGER	COMRWP	REFS	147 63	105	116
2 ITAPER	INTEGER	INTEGER	COMRWP	REFS	147 2*230	42	2*120
0 ITAPES	INTEGER	INTEGER	CTAPES	REFS	147 36	264	202
0 ITAPET	INTEGER	INTEGER	CTABLE	REFS	147 40	97	100
7 ITAPET	INTEGER	INTEGER	COMRWP	REFS	147 I/O REFS	96	111
1 ITAPEW	INTEGER	INTEGER	I/O REFS	REFS	147 133	188	112
				REFS	147 374	134	190
				REFS	147 52	379	265
				REFS	147 219	1/O REFS	284
				REFS	147 213	223	275
				REFS	147 70	3*120	278
				REFS	147 336	344	307
				REFS	147 357	2*358	301
				REFS	147 181	321	311
				REFS	147 164	335	311
				REFS	147 174	350	311
				REFS	147 165	145	311
				REFS	147 174	166	311
				REFS	147 165	168	311
				REFS	147 174	169	311
				REFS	147 165	170	311
				REFS	147 174	173	311
				REFS	147 2*171	75	311
				REFS	147 2*190	76	311
				REFS	147 90	4*91	322
				REFS	147 159	160	324
				REFS	147 159	161	351
				REFS	147 159	162	352
				REFS	147 159	163	352
				REFS	147 159	164	354
				REFS	147 159	165	354
				REFS	147 159	166	354
				REFS	147 159	167	354
				REFS	147 159	168	354
				REFS	147 159	169	354
				REFS	147 159	170	354
				REFS	147 159	171	354
				REFS	147 159	172	354
				REFS	147 159	173	354
				REFS	147 159	174	354
				REFS	147 159	175	354
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				REFS	147 159	177	354
				REFS	147 159	178	354
				REFS	147 159	179	354
				REFS	147 159	180	354
				REFS	147 159	181	354
				REFS	147 159	182	354
				REFS	147 159	183	354
				REFS	147 159	184	354
				REFS	147 159	185	354
				REFS	147 159	186	354
				REFS	147 159	187	354
				REFS	147 159	188	354
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				REFS	147 159	214	354
				REFS	147 159	215	354
				REFS	147 159	216	354
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				REFS	147 159	269	354
				REFS	147 159	270	354
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				REFS	147 159	320	354
				REFS	147 159	321	354
				REFS	147 159	322	354
				REFS	147 159	323	354
				REFS	147 159	324	354
				REFS	147 159	325	354
				REFS	147 159	326	354
				REFS	147 159	327	354
				REFS	147 159	32	

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/ARIABLES	SN	TYPE							
1 KPAGE		INTEGER	CLIST	REFS	38				
242 KR		INTEGER	VARBL\$	REFS	25				
243 KDBBR		INTEGER	VARBL\$	REFS	25				
1641 KSURFT		INTEGER	CTABLE	REFS	277	278	285	DEFINED	50 51
0 KTABLE		INTEGER	CTABLE	REFS	40	DEFINED	270	291	
5 KTABLO		INTEGER	CLIST	REFS	40				
5 KTPAGE		INTEGER	CLIST	REFS	38				
1676 L		INTEGER	CLIST	REFS	150	169	2*171	DEFINED	167
1672 LINE		INTEGER	CLIST	REFS	99	108	109	118	187
			CLIST	REFS	99	108	110	118	185
2 LINES		INTEGER	CLIST	REFS	186				
10 LINESG		INTEGER	CLIST	REFS	38	49	2*281	2*372	
3 LINEST		INTEGER	CLIST	REFS	38				
3537 LL		INTEGER	ARRAY	REFS	13	351	357	DEFINED	346
1721 LLL		INTEGER	ARRAY	REFS	353	2*354	360	3*379	351
1713 LM		INTEGER	ARRAY	REFS	246	249	243	DEFINED	357
1714 LPT		INTEGER	ARRAY	REFS	254	294	321	DEFINED	253
1722 L1L		INTEGER	ARRAY	REFS	354	361	362	2*379	360
1673 M		INTEGER	ARRAY	REFS	134	173	189	DEFINED	278
			CLIST	REFS	186				284
1706 MBOX		INTEGER	CLIST	REFS	285	129	274	DEFINED	
1705 MM		INTEGER	CLIST	REFS	217	305	216	DEFINED	
1643 MTAP16		INTEGER	CLIST	REFS	216	215	216	DEFINED	304
			CLIST	REFS	254	294	294	DEFINED	257
1644 MTAP49		INTEGER	CLIST	REFS	387				
1 NB		INTEGER	CLIST	REFS	130				
154 NBARAY		INTEGER	CLIST	REFS	25				
0 NBOXS		INTEGER	CLIST	REFS	215	303	334	DEFINED	54
			CLIST	REFS	25				256
17550 NC		INTEGER	CLIST	REFS	25				
10 NCARAY		INTEGER	CLIST	REFS	34	229	316	DEFINED	
106 NCF		INTEGER	CLIST	REFS	25				
0 NCNSM1		INTEGER	CLIST	REFS	40				
0 NCOLS		INTEGER	CLIST	REFS	40				
3 NCOLST		INTEGER	CLIST	REFS	40				
3 NDATA		INTEGER	CLIST	REFS	25				
2 NDELT		INTEGER	CLIST	REFS	25				
1647 NELAXS		INTEGER	CLIST	REFS	83	136	137	DEFINED	290
0 NF		INTEGER	CLIST	REFS	48	96	111	111	188
			CLIST	REFS	2				
1720 NFB		INTEGER	CLIST	REFS	339	344	345	DEFINED	
1702 NFP		INTEGER	CLIST	REFS	355	356	333	339	350
			CLIST	REFS	233	234	236	237	
1733 NGP		INTEGER	CLIST	REFS	110	113	116	142	243
1654 NGPI		INTEGER	CLIST	REFS	198	198	73	83	148
			CLIST	REFS	70	73	73	DEFINED	167
			CLIST	REFS	202	205	237	66	183
			CLIST	REFS	182	198	327	66	142
1671 NGPL		INTEGER	CLIST	REFS	2*91	237	237	DEFINED	108
1667 NGPO		INTEGER	CLIST	REFS	91	173	173	DEFINED	182
1652 NGPTOT		INTEGER	CLIST	REFS	65	83	85	85	
1675 NGPX		INTEGER	CLIST	REFS	2*145	2*162	2*162	DEFINED	62
1650 NICH		INTEGER	CLIST	REFS	261	261	144	144	65
			CLIST	REFS	107	107	107	107	

SUBROUTINE	MODAL	74/74	OPT=1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	11
VARIABLES	SN	TYPE	RELOCATION					
1666	NLIN	INTEGER		REFS REFS	84 83	100	105	140
1646	NLINES	INTEGER		REFS REFS	63 181	61	105	140
O	NMODES	INTEGER	F.P.	REFS REFS	197 100	173	274	DEFINED 2
O	NMPT	INTEGER	KMP	REFS REFS	33 95	106	119	132
O	NO	INTEGER	COMSTS	REFS REFS	37			175
4	NOPAN	INTEGER	VARBL\$	REFS REFS	25			
6	NPAGE	INTEGER	CLIST	REFS REFS	38			
6	NPAGEA	INTEGER	CTABLE	REFS REFS	40			
1	NPASS	INTEGER	CTABLE	REFS REFS	40			
1717	NPL	INTEGER	F.P.	REFS REFS	349 135	355	DEFINED 328	
0	NPOINT	INTEGER		REFS REFS	244 323	246 324	247 327	2*250
1700	NPT	INTEGER			193	244	320	355
2	NROWS	INTEGER	C TABLE	REFS REFS	40	DEFINED 40	268	323
72	NSRAY	INTEGER	VARBL\$	REFS REFS	25		289	
1716	NSB	INTEGER	ARRAY	MODD VARBL\$	313	338	DEFINED 299	313
1640	NSURF	INTEGER	REAL	VARBL\$ VARBL\$	19	278	284	285
O	NTBOX	INTEGER	REAL	VARBL\$ VARBL\$	316	304	335	353
1710	NU	INTEGER	F.P.	DEFINED REFS	2	308	DEFINED 171	219
1677	NZLIN	INTEGER	ARRAY	MODD VARBL\$	157	166	166	307
17500	OMG	REAL	REAL	REFS REFS	19	31		156
241	PI	REAL	REAL	REFS REFS	25			
10166	PV	REAL	REAL	REFS REFS	25			
3426	P1	REAL	REAL	REFS REFS	25			
5706	P2	REAL	REAL	REFS REFS	18	130	147	164
11523	Q2	REAL	REAL	REFS REFS	171			
1703	R	REAL		REFS REFS	218 336	226 221	227 309	248 300
1711	RU	REAL	ARRAY	VARBL\$	25	221	225	247
11626	SOELX	REAL	REAL	ARRAY	25	309	DEFINED 220	308
1723	TITLE	REAL	REAL	ARRAY	9	292	DEFINED 280	
O	WILK	LOGICAL		REFS REFS	21 337	50 DEFINED 2	97	99
14400	WW	REAL	ARRAY	MODD VARBL\$	19	31		2*317
326	X	REAL	REAL	ARRAY	25	338	344	322
4371	XAT	REAL	REAL	ARRAY	15	237	349	314
24	XC	REAL	REAL	ARRAY	34	338	355	
1757	XGP	REAL	REAL	ARRAY	12	83	2*91	
1664	XGP <sup>1</sup>	REAL	REAL	DEFINED REFS	74	76	75	2*162
O	XTERM1	REAL	REAL	ARRAY	76	DEFINED 32	67	2*145
24	XTERM2	REAL	REAL	JUNK DEFINED	11	32	67	120
1657	XTM1	REAL	REAL	REFS REFS	74 76	74	75	203
1662	XTM2	REAL	REAL	REFS REFS	16	324	DEFINED 72	324
7243	XX	REAL	REAL	ARRAY	64			324
13266	XO	REAL	REAL	VARBL\$	REFS REFS	25		248
O	X1	REAL	REAL	ARRAY	34			
5	X2	REAL	REAL	ARRAY	34			
1146	Y	REAL	REAL	ARRAY	25	217	305	336
1	YES	INTEGER	INTEGER	COMSTS	4	37	75	379
2337	YGP	RFAI	ARRAY	REFS REFS	17	74	83	2*91

ROUTINE	MODAL	74/74	OPT-1				FTN 4.8+577	85/01/23	08.10.44	PAGE	12
VARIABLES	SN	TYPE	RELOCATION								
1707	YS	REAL					2*162	203	DEFINED	70	
				REFS	218	224					234
50	YTERM1	REAL	ARRAY	JUNK	REFS	306	309	312	DEFINED	217	235
				REFS	12	32	314	68		305	
74	YTERM2	REAL	ARRAY	JUNK	DEFINED	248	64	67		112	226
				REFS	12	32				115	
1656	YTM1	REAL			DEFINED	64					227
1661	YTM2	REAL			REFS	74					
1000	..	REAL	ARRAY		REFS	76					
10703	YX	REAL	ARRAY		REFS	16					
3727	YY	REAL	ARRAY		REFS	16	247				
13350	YO	REAL	ARRAY	VARBL	REFS	14	237				
12	Y1	REAL	ARRAY	CNTRL	REFS	25					
17	Y2	REAL	ARRAY	CNTRL	REFS	34					
3703	ZEL	REAL	ARRAY	VARBL	REFS	34	230				
11006	ZV	REAL	ARRAY	VARBL	REFS	25					
1766	ZZ	REAL	ARRAY	VARBL	REFS	25					
4246	ZZ1	REAL	ARRAY	VARBL	REFS	25					
6526	ZZ2	REAL	ARRAY	VARBL	REFS	25					
13432	Z0	REAL	ARRAY	VARBL	REFS	25					
2606	Z1	REAL	ARRAY	VARBL	REFS	25					
5066	Z2	REAL	ARRAY	VARBL	REFS	25					
VARIABLES USED AS FILE NAMES. SEE ABOVE											
EXTERNALS		TYPE	ARGS	REFERENCES							
FORM			7	83							
HELGA			11	237	349						
PLB			3	264	266						
PROGNA			2	47							
PTABLE			3	271	292						
RNRW			3	130	254						
TITLES			1	263	282						
INLINE FUNCTIONS		TYPE	ARGS	DEF LINE	REFERENCES						
ABS		REAL	1	INTRIN	250						
MINO		INTEGER	0	INTRIN	205						
STATEMENT LABELS			DEF LINE	REFERENCES							
0	1		123	105							
152	2		101	95							
201	3		114	106							
715	5		326	321							
0	6		251	243							
527	7		249	245							
744	8		347	334							
0	9		381	356							
0	10		122	117							
0	11		294								
306	12		156	136							
164	13		112	107							
0	15		151	140							
265	16		147	143							
0	17		172	157							
222	18		121	119							
326	19		164	160							

## STATEMENT LABELS

## 74/74

DEF LINE

REFERENCES

416	20		193	175
0	22		204	202
357	24		173	152
0	30	FMT	231	229
476	31	FMT	233	228
0	32	FMT	318	316
740	35		339	337
703	36		320	315
1426	50	FMT	393	97
1432	51	FMT	394	112
1445	52	FMT	397	113
403	60	FMT	190	181
1460	62	FMT	400	64
1463	63	FMT	401	70
1465	70	FMT	402	100
0	77		93	89
1475	82	FMT	404	190
1501	83	FMT	405	61
0	99		354	350
643	100		293	275
1053	120		382	303
573	123		273	262
0	150		255	129
1021	200		370	368
1035	250		377	369
0	300		222	219
0	301		310	307
1050	310		380	366
1503	400	FMT	406	96
1507	450	FMT	407	134
0	570		386	274
1624	718	FMT	431	120
244	862		135	132
536	875		252	197
501	876		235	215
0	1082		78	63
0	1083		77	73
1520	2000	FMT	409	277
1531	2050	FMT	411	278
1542	2100	FMT	413	284
1554	2150	FMT	415	285
1566	2300	FMT	417	374
1607	2500	FMT	421	379
1612	3000	FMT	426	280
1614	4000	FMT	428	265
32	1082	INDEX	63	LENGTH
74	1083	JK	73	PROPERTIES
124	77	K	89	EXT REFS
153	1	I	105	NOT INNER
210	10	J	117	OPT
233	150	M	129	OPT
250	15	K	140	EXT REFS
277	15	L	148	NOT INNER
311	17	K	157	INSTACK
346	17	-	167	NOT INNER

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS	NOT INNER
367	60	J	181 190	27B		EXT REFS	
	K		183 190	22B		EXT REFS	
372	60	KL	197 252	121B	INSTACK	EXT REFS	NOT INNER
420	875	LM	202 204	4B			
427	22	I					
442	876	MM	215 235	43B			
450	300	NU	219 222	6B	INSTACK	NOT INNER	
			229 231	7B	INSTACK	EXITS	
467	30	II	243 251	14B	INSTACK	OPT	
520	6	LM					
574	570	M	274 386	300B			
652	120	I	303 382	204B			
660	301	NU	307 310	6B	INSTACK		
			316 318	7B	INSTACK	EXITS	
674	32	II	321 326	6B	INSTACK	INSTACK	
710	5	J					
732	8	II	334 347	13B			
755	99	J	350 354	13B			
774	9	J	356 381	57B			
					EXT REFS		
COMMON BLOCKS	VARBLS	LENGTH	MEMBERS - BIAS NAME(LENGTH)				
		6014	O NCNSM1 (1)	1	NB (1)	2 NDELT (1)	
			3 NDATA (1)	4 NOPAN (1)	5 IQ (1)		
			6 IR (1)	7 JSPECS (1)	8 NCARAY (50)		
			58 NSRAY (50)	108 NBARAY (50)	158 ACAP (1)		
			159 B2 (1)	160 FL (1)	161 PI (1)		
			162 KR (1)	163 KRDNR (1)	164 GMA (50)		
			214 X (400)	614 Y (400)	1014 ZZ (400)		
			1414 Z1 (400)	1814 P1 (400)	2214 ZZ1 (400)		
			2614 Z2 (400)	3014 P2 (400)	3414 ZZ2 (400)		
			3814 EV (400)	4214 PV (400)	4614 ZV (400)		
			5014 SDELX (400)	5414 DELY (400)	5814 XO (50)		
			5864 YO (50)	5914 ZO (50)	5964 GGMA (50)		
MODD	8041	O C (3200)	3200 DETAD (3200)	6400 WW (1600)			
		8000 DMG (40)	8040 NC (1)				
JUNK	81	O XTERM1 (20)	20 XTERM2 (20)			40 YTTERM1 (20)	
		60 YTERM2 (20)	80 DIST (1)				
KMP	2	O NMPT (1)	1 KLNN (1)				
CNTRL	71	O X1 (5)	5 X2 (5)				
		15 Y2 (5)	20 XC (50)				
CHSP	1	O KDEG (1)					
COMRWP	3	O ITAPER (1)					
COMSTS	2	O NO (1)					
CLIST	11	O COUNT (1)	1 ITAPEW (1)			2 ITAEEP (1)	
		3 LINEST (1)	1 YES (1)			2 LINES (1)	
		6 NPAGE (1)	1 KPAGE (1)			5 KTPAGE (1)	
		9 KOUNTH (1)	4 KLABEL (1)			8 LINESG (1)	
CTABLE	8	O KTABLE (1)	7 KBPAGE (1)				
		3 NCOLS (1)	10 KOUNTI (1)				
		6 NPAGEA (1)	1 NPASS (1)			2 NROWS (1)	
CTAPES	50	O ITAPES (50)	4 NCOLST (1)			5 KTABLE (1)	
			7 ITAPET (1)				
STATISTICS							
PROGRAM LENGTH							
CM LABELED COMMON LENGTH			12121B	5201			
52000B CM USED			33714B	14284			

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1      C      SUBROUTINE HELP (NF,NM,NCS,NBOXS,NTOT,ITAPE,KHELP)      HELP
2      C      DIMENSION XC(050) .   X1(5) .   X2(5) .   XC(400)      HELP
3      C      DIMENSION Y1(5) .   Y2(5) .   XI(400) .   ITAPES(50)      HELP
4      C      COMMON /VARBLS / NCNSM1,NB,NDELT,NDATA,NOPAN,IQ,IR,JSPECs,      HELP
5      C      NCARAY(50),NSARAY(50),NBARY(50),ACAP,B2,FL,PI,      HELP
6      C      KR,KRDBR,GMA(50),X(400),Y(400),ZZ(400),Z1(400),      HELP
7      C      P1(400),ZZ1(400),Z2(400),P2(400),ZZ2(400),      HELP
8      C      EV(400),PV(400),ZV(400),SDELX(400),DELY(400),      HELP
9      C      X0(50),YO(50),ZO(50),GGMA(50)      HELP
10     C      COMMON /KMP/ NMPT , KLNn      HELP
11     C      COMMON /CNTRL/ XI , X2 , Y1 , Y2 , XC , NCF      HELP
12     C      COMMON /CTAPES / ITAPES      HELP
13     C      ITAPER = ITAPES(5)      HELP
14     C      ITAPEW = ITAPES(6)      HELP
15     C      MTAP14 = ITAPES(34)      HELP
16     C      MTAP15 = ITAPES(35)      HELP
17     C      ITAPER = ITAPES(5)      HELP
18     C      ITAPEW = ITAPES(6)      HELP
19     C      MTAP14 = ITAPES(34)      HELP
20     C      MTAP15 = ITAPES(35)      HELP
21     C      GO TO (10, 45) . KHELP      HELP
22     C      10 NCF = NCS      HELP
23     C      IF (NMPT,NE,O) WRITE (ITAPEW,1)      HELP
24     C      DO 20 II=1,NCS      HELP
25     C      READ (ITAPER,30) X1(II) , Y1(II) , X2(II) , Y2(II)      HELP
26     C      IF (NMPT,EO,O) GO TO 3      HELP
27     C      WRITE (ITAPEW,2) II , X1(II) , Y1(II) , X2(II) , Y2(II)      HELP
28     C      3 CONTINUE      HELP
29     C      20 CONTINUE      HELP
30     C      NSB = 0      HELP
31     C      YS = 0.0      HELP
32     C      DO 40 J = 1,NBOXS      HELP
33     C      MBOX = NTOT + J      HELP
34     C      IF (YS,EQ,Y(MBOX)) GO TO 40      HELP
35     C      YS = Y(MBOX)      HELP
36     C      NSB = NSB + 1      HELP
37     C      DO 25 I = 1,NCS      HELP
38     C      IF (YS,LE,Y1(I)) GO TO 25      HELP
39     C      IF (YS,GE,Y2(I)) GO TO 25      HELP
40     C      XC(NSB) = X1(I) + (X2(I) - X1(I))* (YS - Y1(I)) / (Y2(I) - Y1(I))      HELP
41     C      GO TO 40      HELP
42     C      25 XC(NSB) = 1.0E+06      HELP
43     C      40 CONTINUE      HELP
44     C      GO TO 100      HELP
45     C      45 CONTINUE      HELP
46     C      REWIND MTAP14      HELP
47     C      REWIND MTAP15      HELP
48     C      nn EN 1 = 1 NM      HELP
49     C      HELPF      HELP
50     C      HELPF      HELP
51     C      HELPF      HELP
52     C      HELPF      HELP
53     C      HELPF      HELP
54     C      HELPF      HELP
55     C      HELPF      HELP
56     C      HELPF      HELP
57     C      HELPF      HELP
58     C      HFIP      HELP

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IF (KLNN.EQ.0) GO TO 4          HELP 59
WRITE (ITAPEW,70) NF             HELP 60
WRITE (ITAPEW,71) I              HELP 61
4 CONTINUE                         HELP 62
DO 5 J = 1,3                     HELP 63
CALL RNRW (-MTAP15,XA,NBOXS)    HELP 64
CALL RNRW (-MTAP14,XI,NBOXS)    HELP 65
5   R = 0.0                          HELP 66
NSB = 0                           HELP 67
DO 50 JJ = 1,NBOXS               HELP 68
MBOX = NTOT + JJ                 HELP 69
XW = X(MBOX)                     HELP 70
YW = Y(MBOX)                     HELP 71
IF (YW.EQ.R) GO TO 28           HELP 72
NSB = NSB + 1                   HELP 73
IF (YW.GE.Y1(JJ).AND.YW.LE.Y2(JJ)) GO TO 28
R = YW                           HELP 74
DO 27 II = 1,NCS                HELP 75
IF (KLNNEQ.O) GO TO 28          HELP 76
27 CONTINUE                       HELP 77
GO TO 50                           HELP 78
28 IF (XW.LT.XC(NSB)) )        GO TO 50
      XI(JJ) = XA(JJ)             HELP 79
50 CONTINUE                         HELP 80
C CALL RNRW (ITAPE,XI,NBOXS)     HELP 81
IF (KLNNEQ.O) GO TO 5             HELP 82
IF (J .EQ. 1) WRITE (ITAPEW,81)    HELP 83
IF (J .EQ. 2) WRITE (ITAPEW,82)    HELP 84
IF (J .EQ. 3) WRITE (ITAPEW,83)    HELP 85
WRITE (ITAPEW,73) (K,XI(K),K=1,NBOXS)
5 CONTINUE                         HELP 86
60 CONTINUE                         HELP 87
REWIND MTAP14                      HELP 88
REWIND MTAP15                      HELP 89
100 CONTINUE                         HELP 90
C C FORMATS                         HELP 91
C 1 FORMAT (/20X,35HCOORDINATES OF HINGE LINE IN INCHES//13X,
1 7HSURFACE,26X,7HINBOARD,27X,8HOUTBOARD, //14X,5HINDEX,        HELP 92
2 22X,1HX,14X,1HY,19X,1HX,14X,1HY,//)                         HELP 93
2 FORMAT ((15X,13,2(10X,E10.2,5X,E10.2))/)                      HELP 94
30 FORMAT (4E10.2)                  HELP 95
70 FORMAT (1H1, 20X, 15HSURFACE NUMBER ,I3, //3X, 67HINTERPOLATED MOD
1AL DATA FOR SURFACE AND CONTROL SURFACE COMBINATION.//)        HELP 96
71 FORMAT (20X, BHMODE NO , 13//)                      HELP 97
73 FORMAT (6(4X,14,2X,E10.3))          HELP 98
81 FORMAT (10X,6HBOX NUMBER FOLLOWED BY H(1/4 CHORD) * ELEMENT AREA
1(SQ. FT.) )                  HELP 99
82 FORMAT (10X,35HBOX NUMBER FOLLOWED BY H(3/4 CHORD) )            HELP 100
83 FORMAT (10X,39HBOX NUMBER FOLLOWED BY ALPHA(3/4 CHORD) )          HELP 101
110 RETURN END                         HELP 102
C

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28 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS 3 HELP	DEF LINE 1	REFERENCES 111	RELOCATION	VARIABLES	SN	TYPE	REFS
236 ACAP	REAL		VARBLS	VARBLS	8	REAL	REFS
237 B2	REAL		VARBLS	VARBLS	8	REAL	REFS
12446 DELV	REAL		ARRAY	VARBLS	8	REAL	REFS
7346 EV	REAL		ARRAY	VARBLS	8	REAL	REFS
240 FL	REAL		ARRAY	VARBLS	8	REAL	REFS
13514 GGMA	REAL		ARRAY	VARBLS	8	REAL	REFS
244 GMA	REAL		ARRAY	VARBLS	8	REAL	REFS
430 I	INTEGER		ARRAY	VARBLS	8	INTEGER	REFS
423 I1	INTEGER		ARRAY	VARBLS	8	INTEGER	REFS
5 IQ	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
6 IR	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
0 ITAPE	INTEGER		F.P.	REFS	82	INTEGER	DEFINED
417 ITAPER	INTEGER		DEFINED	19	1/0 REFS	32	
0 ITAPES	INTEGER		REFS	6	16	19	
420 ITAPEW	INTEGER		REFS	20	1/0 REFS	30	
			DEFINED	85	86	87	
			REFS	40	84	34	
			REFS	68	2*79	DEFINED	
			REFS	8	85	86	
			DEFINED	67			
426 J	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
432 JJ	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
7 JSPECS	INTEGER		F.P.	REFS	28	INTEGER	DEFINED
435 K	INTEGER		KMP	REFS	14	INTEGER	DEFINED
0 KHELP	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
1 KLNN	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
242 KR	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
243 KROBR	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
427 NBOX	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
421 MTAP14	INTEGER		REFS	41	42	69	
422 MTAP15	INTEGER		REFS	64	DEFINED	21	
1 NB	INTEGER		REFS	63	DEFINED	22	
154 NBARAY	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
0 NBOXS	INTEGER		REFS	39	63	64	
			DEFINED	1	70	70	
			REFS	29	1/0 REFS	54	
			REFS	31	1/0 REFS	55	
10 NCARAY	INTEGER		ARRAY	VARBLS	8	INTEGER	DEFINED
106 NCF	INTEGER		CNTRL	VARBLS	8	INTEGER	REFS
0 NCNSM1	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
0 NCS	INTEGER		F.P.	REFS	29	31	
3 NDATA	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
2 NDELT	INTEGER		F.P.	REFS	8	INTEGER	REFS
0 NF	INTEGER		F.P.	REFS	59	DEFINED	1
0 NM	INTEGER		F.P.	REFS	57	DEFINED	1
0 NMPT	INTEGER		KMP	REFS	14	30	33
4 NOPAN	INTEGER		VARBLS	VARBLS	8	INTEGER	REFS
72 NSARAY	INTEGER		ARRAY	VARBLS	8	INTEGER	REFS
424 NSB	INTEGER		REFS	43	47	49	
			DEFINED	29	44	74	
			REFS	1			

## SUBROUTINE HELP

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PAGE 4

## VARIABLES SN TYPE RELOCATION

74/74 OPT=1 DEFINED

0	NTOT	INTEGER	F.P.	37	43	66	72
241	PI	REAL	VARBL\$	40	68	DEFINED	1
10166	PV	REAL	ARRAY	REFS	8		
3426	P1	REAL	ARRAY	REFS	8		
5706	P2	REAL	ARRAY	REFS	8		
431	R	REAL	ARRAY	REFS	8		
11626	SDELX	REAL	ARRAY	DEFINED	71		
326	X	REAL	ARRAY	REFS	8		
436	XA	REAL	ARRAY	REFS	5		
24	XC	REAL	ARRAY	REFS	3		
1256	XI	REAL	ARRAY	REFS	5		
433	XW	REAL	ARRAY	REFS	78		
13266	XO	REAL	ARRAY	REFS	8		
0	X1	REAL	ARRAY	REFS	3		
5	X2	REAL	ARRAY	REFS	3		
1146	Y	REAL	ARRAY	REFS	8		
425	YS	REAL	ARRAY	REFS	41		
434	YW	REAL	ARRAY	REFS	71		
13350	YO	REAL	ARRAY	REFS	8		
12	Y1	REAL	ARRAY	DEFINED	32		
17	Y2	REAL	ARRAY	CNTRL	4		
11006	ZV	REAL	ARRAY	REFS	71		
1766	ZZ	REAL	ARRAY	REFS	8		
4246	ZZZ1	REAL	ARRAY	REFS	8		
6526	ZZZ2	REAL	ARRAY	REFS	8		
13432	Z0	REAL	ARRAY	REFS	8		
2606	Z1	REAL	ARRAY	REFS	8		
5066	Z2	REAL	ARRAY	REFS	8		
VARIABLES USED AS FILE NAMES. SEE ABOVE							
EXTERNALS RNRW							
STATEMENT LABELS		TYPE	ARGS	REFERENCES			
324	1	FMT	3	63	64	82	
342	2	FMT		DEF LINE	REFERENCES		
50	3		97	30			
117	4		100	34			
216	5		35	33			
22	10		61	58			
0	20		88	62			
75	25		29	28			
0	27		36	31			
153	28		49	44			
346	30	FMT	78	74			
102	40		101	45			
105	45		50	39			
160	50		52	28			
0	60		80	67			
350	70	FMT	89	57			
364	71	FMT	102	59			
367	73	FMT	104	60			
372	81	FMT	105	87			
...	...	...	106	84			

STATEMENT	LABELS	DEF LINE	REFERENCES
410	83	FMT	109 86
227	100		92 51
LOOPS	LABEL	INDEX	FROM-TO LENGTH PROPERTIES
27	20	J	31 36 24B NOT INNER
55	40	J	39 50 30B OPT EXITS
64	25	I	44 49 16B EXT REFS NOT INNER
112	60	I	57 89 111B EXT REFS NOT INNER
120	5	J	62 88 101B EXT REFS NOT INNER
133	50	JJ	67 80 30B NOT INNER
144	27	II	74 76 INSTACK EXITS
206	K		87 87 7B EXT REFS
COMMON BLOCKS	VARBLS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
		6014	O NCNSM1 (1)
			3 NDATA (1)
			6 TR (1)
			58 NSARAY (50)
			159 B2 (1)
			160 FL (1)
			162 KR (1)
			163 KDBR (1)
			214 X (400) 614 Y (400)
			1414 Z1 (400) 1814 P1 (400)
			2614 Z2 (400) 3014 P2 (400)
			3814 EV (400) 4214 PV (400)
			5014 SDELEX (400) 5414 DELY (400)
			5864 YO (50) 5914 Z0 (50)
KMP	2	O NMPT (1)	1 KLNN (1)
CNTRL	71	O X1 (5)	5 X2 (5)
		15 Y2 (5)	20 XC (50)
CTAPES	50	O ITAPES (50)	
STATISTICS	PROGRAM LENGTH	2114B	1100
	CM LABELED COMMON LENGTH	13771B	6137
	52000B CM USED		

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1      SUBROUTINE BIDI (NM,NPOINT,NTBOX)
2      COMMON /VARBLS / NCNSM1,NB, NDELT,INDATA,NOPAN,IQ,IR,JSPECs,
3      NCARAY(50),NSARAY(50),NBARRAY(50),ACAP,B2,FL,PI,
4      KR,KRDBB,GMA(50),X(400),Y(400),Z(400),P2(400),
5      P1(400),Z21(400),Z22(400),Z2Z(400),
6      EV(400),PV(400),ZV(400),SDELX(400),DELY(400),
7      XO(50),YO(50),ZO(50),GGM(50)
8      COMMON/BODY/ R0(100), R0P(100), NBEA(20), BGMA(20),
9      MRK(20,2),
10     XBO(20), YBO(20), ZBO(20)
11
12     COMMON / CTAPES / ITAPES
13     DIMENSION XI(400)
14     DIMENSION ITAPES(50)

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C
C INITIAL CONDITIONS
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      MTAP15 = ITAPES(35)
      IBTAPE = ITAPES(40)
      NTEL = NCNSM1
      MMRK = MRK(1,1)
      DO 1 I = 1,NB
      NEL = NBEA(I)
      IF (I.GT.1) NEL = NEL - NBEA(I-1)
      NIB = MRK(I,2) - MRK(I,1) + 1
      ITAPE = IBTAPE + I
      REWIND ITAPE
      CALL BEIN (I,NM,ITAPE,NPOINT,NIB,NEL,NTEL)
      MK = MRK(1,1)
      IF (MK.LT.MMRK) MMRK = MK
      1 NTEL = NTEL + NEL
      DO 2 N = 1,NM
      DO 3 J = 1,4
      JB = 1
      DO 4 I = 1,NB
      ITAPE = IBTAPE + I
      NEL = NBEA(I)
      IF (I.GT.1) NEL = NEL - NBEA(I-1)
      CALL RNWR (-ITAPE,XI(JB),NEL)
      4 JB = JB + NEL
      JB = JB - 1
      3 CALL RNWR (IBTAPE,XI(JB))
      DO 5 J = 1,3
      DO 7 I = 1,400
      7 XI(I) = 0.0
      DO 6 I = 1,NB
      JP = MRK(I,1)
      NIB = MRK(I,2) - MRK(I,1) + 1
      ITAPE = IBTAPE + I
      CALL RNWR (-ITAPE, XI(JP), NIB)
      6 CONTINUE
      JP = NCNSM1 - NTBOX
      J1 = MMRK
      5 CALL RNWR (MTAP15, XI(J1), JP)
      IF (N.NE.NM) GOTO 2
      DO 8 I=1,NB

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ITAPE = IBTAPE + 1
8 REWIND ITAPE
2 CONTINUE
REWIND MTAP15
REWIND IBTAPE
RETURN
END

```

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BIDI 59
BIDI 60
BIDI 61
BIDI 62
BIDI 63
BIDI 64
BIDI 65

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### SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	BIDI	1	63
VARIABLES	SN	TYPE	RELOCATION
236 ACAP	REAL	ARRAY	VARBL\$
334 BGMA	REAL	ARRAY	BODY
237 B2	REAL	ARRAY	VARBL\$
12446 DELY	REAL	ARRAY	VARBL\$
7346 EV	REAL	ARRAY	VARBL\$
240 FL	REAL	ARRAY	VARBL\$
13514 GGMA	REAL	ARRAY	VARBL\$
244 GMA	REAL	ARRAY	VARBL\$
216 I	INTEGER	ARRAY	VARBL\$
213 IBTAPE	INTEGER		DEFINED
5 IO	INTEGER		REFS
6 IR	INTEGER		REFS
221 ITAPE	INTEGER		DEFINED
0 ITAPES	INTEGER	ARRAY	CTAPES
224 J	INTEGER	ARRAY	
225 JB	INTEGER	ARRAY	
226 JP	INTEGER		REFS
7 JSPECS	INTEGER		REFS
227 J1	INTEGER		REFS
242 KR	INTEGER		REFS
243 KROBR	INTEGER		REFS
222 MK	INTEGER		REFS
215 MMRK	INTEGER		REFS
360 MRK	INTEGER		REFS
212 MTAP15	INTEGER		REFS
223 N	INTEGER		REFS
1 NB	INTEGER		REFS
154 NBARAY	INTEGER	ARRAY	VARBL\$
310 NBEA	INTEGER	ARRAY	BODY
10 NCARAY	INTEGER	ARRAY	VARBL\$
0 NCNSM1	INTEGER		REFS
3 NDATA	INTEGER		REFS
2 NDELT	INTEGER		REFS
147			REFS

AD-A152 278

ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER  
PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1

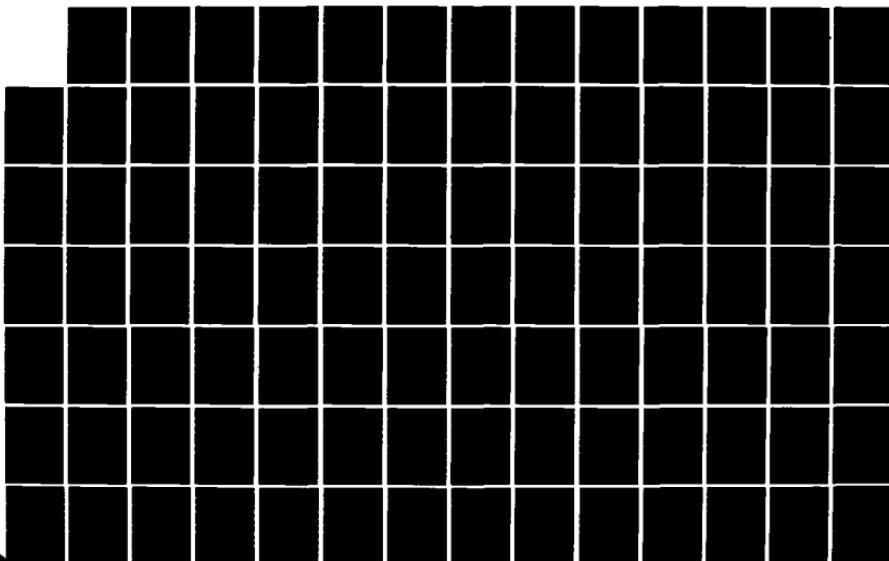
7/8

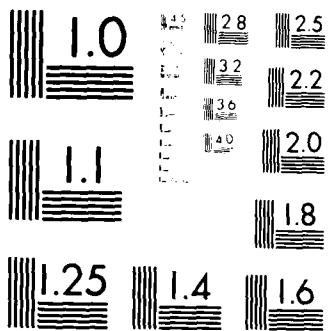
UNCLASSIFIED

N88019-81-C-0395

F/G 9/2

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963

VARIABLES	SN	TYPE	RELOCATION	DEFINED	23	24	38	39
220 NIB		INTEGER	F.P.	REFS	26	51	DEFINED	25
O NM		INTEGER	VARBL\$	REFS	28	56	DEFINED	49
4 NOPAN		INTEGER	F.P.	REFS	2			1
O NOPINT		INTEGER	VARBL\$	REFS	28		DEFINED	
72 NSRAY		INTEGER	ARRAY	REFS	2			
O NTBOX		INTEGER	F.P.	REFS	53		DEFINED	
214 NTEL		INTEGER		REFS	28	32	DEFINED	20
241 PI		REAL	VARBL\$	REFS	2			32
10166 PV		REAL	ARRAY	VARBL\$	REFS	2		
3426 P1		REAL	ARRAY	VARBL\$	REFS	2		
5706 P2		REAL	ARRAY	VARBL\$	REFS	2		
O RO		REAL	ARRAY	BODY	REFS	8		
144 ROP		REAL	ARRAY	BODY	REFS	8		
11626 SDELEX		REAL	ARRAY	BODY	REFS	2		
3226 X		REAL	ARRAY	BODY	REFS	2		
430 XBO		REAL	ARRAY	BODY	REFS	2		
230 XI		REAL	ARRAY	BODY	REFS	8		
13266 X0		REAL	ARRAY	VARBL\$	REFS	2		
1146 Y		REAL	ARRAY	VARBL\$	REFS	2		
454 YBO		REAL	ARRAY	BODY	REFS	8		
13350 YO		REAL	ARRAY	VARBL\$	REFS	2		
500 ZBO		REAL	ARRAY	BODY	REFS	8		
11006 ZV		REAL	ARRAY	VARBL\$	REFS	2		
1766 ZZ		REAL	ARRAY	VARBL\$	REFS	2		
4246 ZZ1		REAL	ARRAY	VARBL\$	REFS	2		
6526 ZZZ		REAL	ARRAY	VARBL\$	REFS	2		
13432 ZO		REAL	ARRAY	VARBL\$	REFS	2		
2606 Z1		REAL	ARRAY	VARBL\$	REFS	2		
5066 Z2		REAL	ARRAY	VARBL\$	REFS	2		
VARIABLES USED AS FILE NAMES, SEE ABOVE								
EXTERNALS		TYPE	ARGS	REFERENCES				
BEGIN			7	28				
RNRW			3	40	43	51	55	

STATEMENT LABELS	LABEL	INDEX	FROM-TO	LENGTH	REFERENCES	PROPERTIES
O 1	I	I	22 32	31B		EXT REFS
145 2	N		33 60	101B		NOT INNER
O 3	J		34 43	27B		EXT REFS
O 4	I		36 41	17B		NOT INNER
O 5	J		44 55	33B		EXT REFS
O 6	I		45 46	2B	INSTACK	NOT INNER
O 7			46 45			EXT REFS
O 8			59 57			EXT REFS

SUBROUTINE BIDI

74/74 OPT=1

COMMON BLOCKS LENGTH

VARBL'S 6014 MEMBERS - BIAS NAME(LENGTH)

0	NCNSM1	(1)
3	NDATA	(1)
6	IR	(1)
58	NSARAY	(50)
159	B2	(1)
162	KR	(1)
214	X	(400)
1414	Z1	(400)
2614	Z2	(400)
3814	EV	(400)
5014	SDELX	(400)
5864	YO	(50)
BODY	340	O RO (100)
		220 BGMA (20)
		300 YBO (20)
C TAPES	50	O ITAPES (50)

STATISTICS

PROGRAM LENGTH	1056B	558
CM LABELED COMMON LENGTH	14404B	6404
520008 CM USED		

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1	NB	(1)
4	NOPAN	(1)
7	JSPECS	(1)
108	NBARAY	(50)
160	FL	(1)
163	KRDBR	(1)
614	Y	(400)
1814	P1	(400)
3014	P2	(400)
4214	PV	(400)
5414	DELY	(400)
5914	Z0	(50)
100	ROP	(100)
240	MRK	(40)
320	ZBO	(20)

2 NDELT (1)

5 IQ (1)

8 NICARAY (50)

158 ACAP (1)

161 PI (1)

164 GMA (50)

1014 Z2 (400)

2214 Z22 (400)

3414 Z22 (400)

4614 ZV (400)

5814 X0 (50)

5964 GGMA (50)

200 NBEA (20)

280 XBO (20)

SUBROUTINE BEIN

74/74 OPT=1

FTN 4.8+577

PAGE 1

1 C SUBROUTINE BEIN (NF,NM,ITAPE,NPOINT,NIB,NEL,NTEL)

1 COMMON /VARBLS / NCNSM1 NB NDELT, NDATA, NOPAN, IQ, IR, JSPECS,

1 NCARAY(50), NSRAY(50), NBARY(50), ACAP, B2, FL, PI,

1 BEIN 3 KR, KROBR, GMA(50), X(400), Y(400), Z1(400),

1 BEIN 4 P1(400), Z2(400), P2(400), Z22(400),

1 BEIN 5 EV(400), PV(400), ZV(400), SDELX(400), DELY(400),

1 BEIN 6 XO(50), YO(50), ZO(50), GMMA(50)

1 BEIN 7 COMMON/BODY/ RO(100), ROP(100), NBEA(20), BGMA(20), MRK(20,2),

1 BEIN 8 XBO(20), YBO(20), ZBO(20)

1 BEIN 9 COMMON /MODD / BPR, DETAD, WW, OMG, NC

1 BEIN 10 COMMON /COMA / LC, BR

1 BEIN 11 COMMON /CHSP/ KDEG

1 BEIN 12 COMMON /CTAPES / ITAPES

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SUBROUTINE BEIN      74/74      OPT-1

        ID = 7
        EPS = 0.01
        XGP1 = XGP(1,1)
        D(1,1) = 0.0
        D(1,2) = 0.0
        D(NGP,1) = 0.0
        D(NGP,2) = 0.0
        F = XGP1
        CALL SPLIT3 (XGP,DE)
        DO 160 N = 1,NEL
        NN = NTEL + N
        F = EV(NN)
        LIND = 2
        CALL SPLIT3 (XGP,DE)
        BBN = DELY(NN)*S
        IF (ABS(Y(NN)).LT.O
        F = X(NN)
        CALL SPLIT3 (XGP,DE)
        H(N) = AN(1)
        DH1(N) = AN(2) * B2
        DH2(N) = AN(3) * BB
        160 CALL RNRW (ITAPE,BB,
        CALL RNRW (ITAPE,H,
        CALL RNRW (ITAPE,DH,
        CALL RNRW (ITAPE,DH,
        IF (LDD.EQ.0) GO TO 10
        WRITE (ITAPEW,550)
        DO 11 N = 1,NEL
        NN = NTEL + N
        11 WRITE (ITAPEW,551)
        10 CONTINUE
        WRITE (ITAPEW,553)
        II = MRK(NF,1) - 1
        DO 12 N = 1,NBPS
        NN = II + N
        F = EV(NN)
        CALL SPLIT3 (XGP,DE)
        A(N) = AN(1) / B22
        F = X(NN)
        CALL SPLIT3 (XGP,DE)
        B(N) = AN(1)
        C(N) = AN(2) * B2
        IF (LDD.NE.0) WRITE
        15 = IPANEL
        DO 15 J = 1,NSTRIP
        IF (BGMA(NF).EQ.0)
        IF (BGMA(NF).NE.0)
        IS = IS + 1
        JJ = (J-1)*NBPS
        II = MRK(NF,1) + JU
        DO 16 N = 1,NBPS
        NN = II + N
        MM = JJJ + N
        BQ(MM) = A(N) * FA
        H(MM) = B(N) * FAC
        DH1(NM) = C(N) * FAC
        15 = IPANEL

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BEIN	59		
BEIN	60		
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115      WRITE (ITAPEW,551) NN, EV(NN), X(NN), BQ(MM), H(MM), DH1(MM)
16      CONTINUE
15      CONTINUE
15      WRITE (ITAPEW,553) IND
        CALL RNRW (ITAPE, BQ,NIB)
        CALL RNRW (ITAPE, H,NIB)
        CALL RNRW (ITAPE,DH1,NIB)
C
150      CONTINUE
        REWIND ITAPE
        NPOINT = NPOINT + NGP
C
C     FORMATS
C
130      62 FORMAT (10I5)
       63 FORMAT (6E10.3)
       400 FORMAT (1H1,19X, 11HBODY NUMBER,14, //)
       450 FORMAT (//15X, 25HINPUT MODAL DATA FOR MODE, 14, //)
           110X,5HPOINT,15X,1HX,10X,10HDEFLECTION, //)
135      451 FORMAT (11X,14,2(5X E16.7))
       550 FORMAT (1H1,2X, 32HINTERPOLATED MODAL DATA FOR MODE, 14, //)
           11X,7HELEMENT,7X,2HXX,14X,2HBB,15X,1HH,14X,3HDH1,14X,3HDH2, //)
140      551 FORMAT (2X,14,3X,7(E14.7,2X))
       552 FORMAT (//3X,3HBOX,9X,2HEV,15X,1HX,14X,2HQ,15X,1HH,14X,3HDH1)
       553 FORMAT (//5X,5HIND =,I2)
C
        RETURN
END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES			
3	BEIN	1	143			
VARIABLES	SN	TYPE	RELOCATION			
632 A	REAL	ARRAY	VARBL\$	REFS	20	95
236 ACAP	REAL	ARRAY	VARBL\$	REFS	3	111
1402 AN	REAL	ARRAY	VARBL\$	REFS	19	76
714 B	REAL	ARRAY	ARRAY	REFS	78	77
632 BB	REAL	ARRAY	ARRAY	REFS	20	75
334 BGMA	REAL	ARRAY	BODY	DEFINED	72	76
O BPR	COMPLEX	ARRAY	MODD	REFS	9	77
1633 BQ	REAL	ARRAY	ARRAY	REFS	11	78
50 BR	REAL	ARRAY	COMA	REFS	21	99
237 B2	REAL	ARRAY	VARBL\$	REFS	12	98
611 B22	REAL	ARRAY	VARBL\$	DEFINED	73	87
1551 C	REAL	ARRAY	VARBL\$	REFS	72	79
1405 D	REAL	ARRAY	VARBL\$	REFS	20	113
				REFS	19	94
				REFS	61	97
				REFS	62	64
				REFS	63	99
				REFS	71	75
				REFS	72	76
				REFS	73	77
				REFS	74	111
				REFS	75	111
				REFS	76	99
				REFS	77	98
				REFS	78	99
				REFS	79	97
				REFS	80	98
				REFS	81	98
				REFS	82	98
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				REFS	145	98

SUBROUTINE BEIN			74/74	OPT=1	FTN 4.8+577			85/01/23. 08.10.44			PAGE	4
VARIABLES	SN	TYPE	RELOCATION									
1356 DEF1		REAL	ARRAY		REFS	19	66	71	75	94	94	97
12446 DELY	REAL	REAL	ARRAY	VARBL\$	DEFINED	56	72	111				
6200 DETAD	COMPLEX	REAL	ARRAY	MODD	REFS	3	24					
2453 DH1	REAL	REAL	ARRAY		REFS	11	81					
714 DH2	REAL	REAL	ARRAY		DEFINED	21	26					
617 EPS	REAL	REAL	ARRAY		REFS	66	71					
7346 EV	REAL	REAL	ARRAY	VARBL\$	DEFINED	59	69					
621 F	REAL	REAL	ARRAY		REFS	3	93					
627 FAC	FAC	REAL	REAL	VARBL\$	DEFINED	66	69					
240 FL	GMA	REAL	REAL	VARBL\$	REFS	65	71					
13514 GGM4	GMA	REAL	REAL	VARBL\$	REFS	111	112					
244 H	REAL	REAL	REAL	VARBL\$	REFS	3	103					
3273 IPANEL	I	INTEGER	INTEGER		REFS	21	80					
607 IO	ID	INTEGER	INTEGER		DEFINED	76	112					
616 IR	IQ	INTEGER	INTEGER		REFS	42	DEFINED					
624 IT	IT	INTEGER	INTEGER		REFS	66	66					
622 IND	IND	INTEGER	INTEGER		REFS	101	71					
606 IPANEL	IPANEL	INTEGER	INTEGER	VARBL\$	DEFINED	58	75					
5 IQ	IR	INTEGER	INTEGER	VARBL\$	REFS	3	109					
6 IR	IS	INTEGER	INTEGER	VARBL\$	REFS	103	104					
625 ITAPE	ITAPE	INTEGER	INTEGER	F.P.	REFS	79	80					
0 ITAPE	ITAPES	ITAPES	ITAPES		DEFINED	1	I/O REFS					
577 ITAPER	ITAPER	INTEGER	INTEGER		DEFINED	29	I/O REFS					
0 ITAPES	ITAPES	INTEGER	INTEGER	CTAPES	REFS	14	22					
600 ITAPEW	ITAPEW	INTEGER	INTEGER		DEFINED	30	I/O REFS					
626 J	J	INTEGER	INTEGER	VARBL\$	REFS	89	100					
630 JJ	JSPECS	INTEGER	INTEGER	CHSP	REFS	106	115					
0 KDEG	KDEG	INTEGER	INTEGER	VARBL\$	REFS	107	110					
615 KIND	KIND	INTEGER	INTEGER	VARBL\$	REFS	3	DEFINED					
242 KR	KR	INTEGER	INTEGER	VARBL\$	REFS	13	DEFINED					
243 KROBR	KROBR	INTEGER	INTEGER	VARBL\$	REFS	66	DEFINED					
0 LC	LC	INTEGER	INTEGER	COMA	REFS	3	DEFINED					
602 LID	LID	INTEGER	INTEGER		REFS	12	16					
623 LIND	LIND	INTEGER	INTEGER		REFS	49	54					
603 LOD	LOD	INTEGER	INTEGER		REFS	71	75					
612 M	M	INTEGER	INTEGER		REFS	83	100					
631 MM	MM	INTEGER	INTEGER		REFS	50	84					
360 MRK	MRK	INTEGER	INTEGER		REFS	111	112					
601 MTAP49	MTAP49	INTEGER	INTEGER	BODY	REFS	9	90					
613 N	N	INTEGER	INTEGER		REFS	48	DEFINED					
1 NB	NBARAY	INTEGER	INTEGER	VARBL\$	REFS	53	55					
154 NBEA	NBEA	INTEGER	INTEGER	VARBL\$	REFS	77	78					
310 NBPS	NBPS	INTEGER	INTEGER	BODY	REFS	77	86					
610 NC	NC	INTEGER	INTEGER		REFS	109	110					
17550					REFS	85	91					
					REFS	3	38					
					REFS	9	94					
					REFS	83	107					
					REFS	50	55					
					REFS	111	113					
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					REFS	31	I/O REFS					
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					REFS	53	56					
					REFS	77	86					
					REFS	109	111					
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VARIABLES	SN	TYPE	RELOCATION	FTN 4.8+577	85/01/23.	08.10.44	PAGE	5
10 NCARAY		INTEGER	ARRAY	VARBL\$	REFS	3		
0 NCNSM1		INTEGER	VARBL\$	REFS	3			
3 NDATA		INTEGER	VARBL\$	REFS	3			
2 NDELT		INTEGER	F.P.	REFS	3			
0 NEL		INTEGER	DEFINED	1				
0 NF		INTEGER	F.P.	REFS	44	90	103	107
604 NGP		INTEGER	DEFINED	1				
604 NGP		INTEGER	REFS	42	52	63	64	71
0 NIB		INTEGER	F.P.	REFS	94	97	126	75
0 NM		INTEGER	F.P.	REFS	43	119	121	
614 NN		INTEGER	REFS	47	DEFINED	41	DEFINED	1
4 NOPAN		INTEGER	VARBL\$	REFS	2*55	56	2*72	2*87
0 NPOINT		INTEGER	F.P.	REFS	93	96	115	86
72 NSRAY		INTEGER	ARRAY	VARBL\$	REFS	3	104	86
605 NSTRIP		INTEGER	ARRAY	VARBL\$	REFS	3	104	86
0 NTEL		INTEGER	ARRAY	F.P.	REFS	43	102	86
17500 OMG		REAL	MODD	VARBL\$	REFS	68	86	86
241 P1		REAL	MODD	VARBL\$	REFS	11	18	18
10166 PV		REAL	ARRAY	VARBL\$	REFS	3		
3426 P1		REAL	ARRAY	VARBL\$	REFS	3		
5706 P2		REAL	ARRAY	VARBL\$	REFS	3		
776 Q2		REAL	ARRAY	VARBL\$	REFS	17	48	56
0 RO		REAL	BODY	BODY	REFS	9		
144 ROP		REAL	ARRAY	BODY	REFS	9		
11626 SDELX		REAL	ARRAY	VARBL\$	REFS	3	72	111
14400 WW		REAL	ARRAY	MODD	REFS	11	18	
326 X		REAL	ARRAY	VARBL\$	REFS	3	74	
430 XBO		REAL	ARRAY	BODY	REFS	9	87	
1332 XGP		REAL	ARRAY	VARBL\$	REFS	19	55	
620 XGP1		REAL	ARRAY	BODY	REFS	97	60	
13266 XO		REAL	ARRAY	VARBL\$	REFS	65	42	
1146 Y		REAL	ARRAY	VARBL\$	REFS	3	73	
454 YBO		REAL	ARRAY	BODY	REFS	9		
13350 YO		REAL	ARRAY	VARBL\$	REFS	3		
500 ZBO		REAL	ARRAY	BODY	REFS	9		
11006 ZV		REAL	ARRAY	VARBL\$	REFS	3		
1766 ZZ		REAL	ARRAY	VARBL\$	REFS	3		
4246 ZZ1		REAL	ARRAY	VARBL\$	REFS	3		
6526 ZZ2		REAL	ARRAY	VARBL\$	REFS	3		
13432 ZO		REAL	ARRAY	VARBL\$	REFS	3		
2606 Z1		REAL	ARRAY	VARBL\$	REFS	3		
5066 Z2		REAL	ARRAY	VARBL\$	REFS	3		
VARIABLES USED AS FILE NAMES. SEE ABOVE								
EXTERNALS		TYPE	ARGS	REFERENCES				
COS		REAL	1 LIBRARY	103				
RNRW			3 LIBRARY	48	79	80	81	82
SIN		REAL	1 LIBRARY	104				120
SPLIT3			12	66	71	75	94	97

SUBROUTINE	BEIN	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE
INLINE	FUNCTIONS	TYPE	ARGS	1 INTRIN	DEF LINE	REFERENCES
	ABS	REAL				
STATEMENT	LABELS			DEF LINE	REFERENCES	
44	8			51	49	
172	10			88	83	
0	11			87	85	
0	12			99	91	
0	15			117	102	
271	16	FMT		116	108	114
516	62	FMT		131	41	
520	63	FMT		132	42	
0	150			123	47	
55	151			56	52	54
0	160	FMT		78	67	
522	400	FMT		133	44	
526	450	FMT		134	50	
537	451	FMT		136	55	
542	550	FMT		137	84	
555	551	FMT		139	87	115
560	552	FMT		140	100	
566	553	FMT		141	89	118
LOOPS	LABEL		INDEX	FROM-TO	LENGTH	PROPERTIES
36	150	M		47 123	261B	EXT REFS
45	151	N		52 56	15B	EXT REFS
75	160	N		67 78	32B	EXT REFS
153	11	N		85 87	17B	EXT REFS
177	12	N		91 99	21B	EXT REFS
225	15	J		102 117	51B	NOT INNER
244	16	N		108 116	30B	EXT REFS
COMMON	BLOCKS		LENGTH	MEMBERS - BIAS NAME(LENGTH)		
VARBLS			6014	O NCNSM1 (1)	1 NB (1)	2 NDELT (1)
				3 NDATA (1)	4 NOPAN (1)	5 IQ (1)
				6 IR (1)	7 USPECS (1)	8 NCARAY (50)
				58 NSRAY (50)	108 NBARAY (50)	158 ACAP (1)
				159 B2 (1)	160 FL (1)	161 PI (1)
				162 KR (1)	163 KRDNR (1)	164 GMA (50)
				214 X (400)	614 Y (400)	1014 ZZ (400)
				1414 Z1 (400)	1814 P1 (400)	2214 ZZ (400)
				2614 Z2 (400)	3014 P2 (400)	3414 ZZ (400)
				3814 EV (400)	4214 PV (400)	4614 ZV (400)
				5014 SDELX (400)	5414 DELY (400)	5814 XO (50)
				5864 YO (50)	5914 ZO (50)	5964 GGMA (50)
BODY			340	O RO (100)	100 ROP (100)	200 NBEA (20)
				220 BGMA (20)	240 MRK (40)	280 XBO (20)
				300 YBO (20)	320 ZBO (20)	6400 WW (1600)
MODD			8041	O BPR (3200)	3200 DETAD (3200)	
COMA			41	8000 DMG (40)	8040 NC (1)	
CHSP			1	O KDEG (1)	40 BR (1)	
CTAPES			50	O LC (40)		
EQUIV CLASSES				MEMBERS - BIAS NAME(LENGTH)		
BB			50	O A (50)		
DH2			50	O B (50)		

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FTN 4.8+577

74/74 OPT=1

SUBROUTINE BEIN

STATISTICS	
PROGRAM LENGTH	4144B
CM LABELED COMMON LENGTH	34227B
52000B CM USED	14487

74 / 74 OPT = 1

FTN 4.8+577

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52 D(NN,3)=-DSN          SPLIT3      59
    D(N,4)= 1.             SPLIT3      60
    GO TO 55               SPLIT3      61
53 D(NN,3)=D(NN,5)        SPLIT3      62
    D(N,4)=S/3            SPLIT3      63
    D(N,1)=DSN-SR         SPLIT3      64
55 KEY=1                  SPLIT3      65
    NN=N                  SPLIT3      66
    GO TO 10               SPLIT3      67
54 N=2                   SPLIT3      68
    D(2,2)=-D(1,3)
    NN=NN-1
    IF (NN.LT.3) GO TO 152
    DO 6 I=3,NN
6   D(I,2)=0.
152 D(NN+1,2)=-D(NN+1,5)
    GO TO 10
10 CALL TRIDI(D(KEY,3),D(KEY,4),D(KEY,5),D(KEY,1),NN,M,L,EPS,IND)
    IF (IND.NE.0)RETURN
    IF (KIND) 19,98,21
19 I=2
    II=1
    ARG=X(1)
    KK=2
    GO TO 2
56 D(II,2)=ANS(2)
    IF (II.NE.1) GO TO 97
    I=N
85  I1=N
    D(1,2)=DS1
    GO 10 2
    98 D(N,2)=DSN
    97 0(1,3)=D(1,1)/2.
    D(1,4)=D(N,1)/2.
    D(2,3)=D(1,2)-D(1,1)*X(1)
    D(2,4)=D(N,2)-D(N,1)*X(N)
    D(3,3)=F(1)-X(1)*D(1,2)-D(1,3)*X(1)
    D(3,4)=F(N)-X(N)*D(N,2)-D(1,4)*X(N)
    GO TO 999
21 SR=SR-(F(2)-F(N))/S1
    SR = D(2,1)*S1/6. + D(N-1,1)*S/6. + SR
    SD = D(2,2)*S1/6. + D(N-1,2)*S/6. + (S+S1)/3.
    D(1,1) = -SR/SD
    D(N,1) = D(1,1)
    DO 22 I=2,NNN
    22 D(I,1)=D(I,1) + D(1,1)*D(I,2)
    GO TO 999
111 CONTINUE
    KK=KEY
    ARG=ARGT
    I=1
    IF (X(1)-ARG) 9,33,30
9   DO 8 I=2,N
    IF (X(I)-ARG) 8,33,2
8   CONTINUE

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FTN 4 8+577

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**CASE NO SEVERITY DETAILS DIAGNOSIS OF PROBLEM**

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME (LENGTH)	FTN 4.8+577
BODY	34C	5014 SDELY (400) 5864 YO (50) O RO (100) 220 BGMA (20) 300 YBO (20) O YS (50) 150 DELYS (50) 300 FGGAM (50) O XOC (400) O ITAPES (50)	5414 DELY (400) 5914 ZO (50) 100 ROP (100) 240 MRK (40) 320 ZBO (20) 50 DELYS (50) 200 FGAMMA (50) 400 XIJ (50)
XXZ	350		
XXZ	450		
CTAPES	50		

STATISTICS  
 PROGRAM LENGTH 547B 359  
 CM LABELED COMMON LENGTH 16044B 7204  
 52000B CM USED

SUBROUTINE	GLOBAL	74 / 74	OPT = *			
VARIABLES	SN	TYPE	RELOCATION			
11006	ZV	REAL	ARRA Y	VARBL S		
1766	ZZ	REAL	ARRA Y	VARBL S		
4246	ZZ1	REAL	ARRA Y	VARBL S		
6526	ZZ2	REAL	ARRA Y	VARBL S		
13432	Z0	REAL	ARRA Y	VARBL S		
515	Z00	REAL	ARRA Y	VARBL S		
2606	Z1	REAL	ARRA Y	VARBL S		
5066	Z2	REAL	ARRA Y	VARBL S		
VARIABLES USED AS FILE NAMES. SEE ABOVE						
EXTERNALS		TYPE	ARGS	REFERENCES		
COS		REAL	1 LIBRARY	24		
SIN		REAL	1 LIBRARY	23		
INLINE FUNCTIONS	ABS	TYPE	ARGS	DEF LINE REFERENCES		
		REAL	1	INTRIN 80		
STATEMENT LABELS			DEF LINE REFERENCES	81		
O	1		87	22		
37	2		36	33		
42	3		37	35		
160	4		63	38		
251	5		86	70		
0	6		107	89		
265	7		93	90		
270	8		94	92		
0	9		105	98		
323	10		108	88		
33	11		32	30		
175	12		69	67		
423	700	FMT	114	29		
437	701	FMT	116	21		
441	702	FMT	117	106		
451	703	FMT	119	60		
454	704	FMT	120	109		
456	705	FMT	121	68		
473	706	FMT	124	31		
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
13	1	NP	22	87	243B	EXT REFS
45	4	J	38	63	116B	EXT REFS
177	5	I	70	86	55B	EXT REFS
260	6	N	89	107	43B	OPT
304	9	K	98	105	11B	NOT INNER
COMMON BLOCKS	VARBL S	LENGTH	MEMBERS - BIAS NAME(LENGTH)			
	6014		O NCNSM1 (1)		1 NB (1)	
			3 NDATA (1)		4 NOPAN (1)	
			6 IR (1)		5 IO (1)	
			58 NSARAY (50)		8 NCARAY (50)	
			159 B22 (1)		7 JSPEC S (1)	
			162 KR (1)		108 NBARAY (50)	
			214 X (400)		16 FL (1)	
			1414 Z1 (400)		163 KDRBR (1)	
			2614 Z2 (400)		64 Y (400)	
			2614 Z3 (400)		1814 P1 (400)	
			2614 Z4 (400)		3014 P2 (400)	
			2614 Z5 (400)		3414 Z22 (400)	
			2614 Z6 (400)		4614 D1 (400)	

			FIN 4 8+577	85/01/23 . 08 . 10 . 44	PAGE	5
VARIABLES	REFS	2	46	60	104	DEFINED
11006	REFS	2	43	60	103	DEFINED
ZV	REFS	2	44	60	103	DEFINED
1766	REFS	2	45	60	103	DEFINED
ZZ	REFS	2	27	56	57	DEFINED
4246	REFS	29	55	56	58	DEFINED
ZZ1	REFS	104	106	27	97	DEFINED
6526	REFS	2	48	60	48	DEFINED
ZZ2	REFS	2	49	60	49	DEFINED
13432	REFS	2	49	60	49	DEFINED
Z0	REFS	2	49	60	49	DEFINED
515	REFS	2	49	60	49	DEFINED
Z00	REFS	2	49	60	49	DEFINED
2606	REFS	2	49	60	49	DEFINED
Z1	REFS	2	49	60	49	DEFINED
5066	REFS	2	49	60	49	DEFINED
Z2	REFS	2	49	60	49	DEFINED
VARIABLES USED AS FILE NAMES. SEE ABOVE						
EXTERNALS						
COS						
SIN						
INLINE FUNCTIONS	ABS	TYPE	ARGS	DEF LINE REFERENCES		
		REAL	1	INTRIN 80		
STATEMENT LABELS			DEF LINE REFERENCES			
O	1		87	22		
37	2		36	33		
42	3		37	35		
160	4		63	38		
251	5		86	70		
0	6		107	89		
265	7		93	90		
270	8		94	92		
0	9		105	98		
323	10		108	88		
33	11		32	30		
175	12		69	67		
423	700	FMT	114	29		
437	701	FMT	116	21		
441	702	FMT	117	106		
451	703	FMT	119	60		
454	704	FMT	120	109		
456	705	FMT	121	68		
473	706	FMT	124	31		
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
13	1	NP	22	87	243B	EXT REFS
45	4	J	38	63	116B	EXT REFS
177	5	I	70	86	55B	EXT REFS
260	6	N	89	107	43B	OPT
304	9	K	98	105	11B	NOT INNER
COMMON BLOCKS	VARBL S	LENGTH	MEMBERS - BIAS NAME(LENGTH)			
	6014		O NCNSM1 (1)		1 NB (1)	
			3 NDATA (1)		4 NOPAN (1)	
			6 IR (1)		5 IO (1)	
			58 NSARAY (50)		8 NCARAY (50)	
			159 B22 (1)		7 JSPEC S (1)	
			162 KR (1)		108 NBARAY (50)	
			214 X (400)		16 FL (1)	
			1414 Z1 (400)		163 KDRBR (1)	
			2614 Z2 (400)		64 Y (400)	
			2614 Z3 (400)		1814 P1 (400)	
			2614 Z4 (400)		3014 P2 (400)	
			2614 Z5 (400)		3414 Z22 (400)	
			2614 Z6 (400)		4614 D1 (400)	

SUBROUTINE	GLOBAL	74/74	OPT=1	RELOCATION	VARBL'S	REFS	2	34	36	PAGE
VARIABLES	SN	TYPE				REFS	38	DEFINED	91	4
7	JSPECS	INTEGER				REFS	38	DEFINED	93	
517	J1	INTEGER				REFS	2*99	2*100	2*102	
520	J2	INTEGER				REFS	98			
541	K	INTEGER				DEFINED				
242	KR	INTEGER			VARBL'S	REFS	2			
243	KRDBR	INTEGER			VARBL'S	REFS	2			
537	K1	INTEGER			VARBL'S	REFS	98	DEFINED	91	
540	K2	INTEGER			VARBL'S	REFS	98	DEFINED	94	
0	LC12	INTEGER			BODY	REFS	30	59	67	
360	MRK	INTEGER		ARRAY	F.P.	REFS	8		83	
536	N	INTEGER			BODY	REFS	90	93	94	
1	NB	INTEGER				DEFINED	89			
154	NBARAY	INTEGER			VARBL'S	REFS	2	88	89	
310	NBEA	INTEGER			VARBL'S	REFS	2	36	37	
10	NCARAY	INTEGER			BODY	REFS	8	93	94	
0	NCNSM	INTEGER			VARBL'S	REFS	2			
3	NDATA	INTEGER			VARBL'S	REFS	2			
2	NDELT	INTEGER			VARBL'S	REFS	2			
4	NOPAN	INTEGER			VARBL'S	REFS	2			
510	NP	INTEGER			VARBL'S	REFS	23	24	25	
						REFS	33	36	37	
						DEFINED	22	22	65	
72	NSARAY	INTEGER		ARRAY	VARBL'S	REFS	2			
241	PI	REAL		ARRAY	VARBL'S	REFS	2			
10166	PV	REAL		ARRAY	VARBL'S	REFS	2			
3426	P1	REAL		ARRAY	VARBL'S	REFS	2			
5706	P2	REAL		ARRAY	BODY	REFS	2			
0	RO	REAL		ARRAY	BODY	REFS	8			
144	ROP	REAL		ARRAY	BODY	REFS	8			
11626	SDELX	REAL		ARRAY	VARBL'S	REFS	2			
511	SS	REAL			VARBL'S	REFS	51			
326	X	REAL			BODY	REFS	78	79	80	
430	XBO	REAL			XXX	REFS	2			
620	XIU	REAL			XXX	REFS	12			
0	XOC	REAL			VARBL'S	REFS	2			
13266	XO	REAL			VARBL'S	REFS	29			
513	XOO	REAL			VARBL'S	REFS	100			
1146	Y	REAL		ARRAY	BODY	REFS	2			
454	YBO	REAL		ARRAY	BODY	REFS	8			
522	YC	REAL				REFS	51			
525	YCV	REAL				REFS	54			
523	YC1	REAL				REFS	52			
524	YC2	REAL				REFS	53			
0	YS	REAL				REFS	10			
13350	YO	REAL		ARRAY	XYZ	REFS	2			
514	YOO	REAL		ARRAY	VARBL'S	REFS	29			
500	ZBO	REAL		ARRAY	BODY	REFS	102			
526	ZC	REAL				REFS	8			
531	ZCV	REAL				REFS	51			
527	ZC1	REAL				REFS	54			
530	ZC2	REAL				REFS	52			
544	ZS	REAL		ARRAY	XYZ	REFS	53			

SUBROUTINE	GLOBAL	74/74	OPT=1	RELOCATION	VARBL'S	REFS	2	34	36	PAGE
VARIABLES	SN	TYPE				REFS	38	DEFINED	91	4
7	JSPECS	INTEGER				REFS	38	DEFINED	93	
517	J1	INTEGER				REFS	2*99	2*100	2*102	
520	J2	INTEGER				REFS	98			
541	K	INTEGER				DEFINED				
242	KR	INTEGER			VARBL'S	REFS	2			
243	KRDBR	INTEGER			VARBL'S	REFS	2			
537	K1	INTEGER			VARBL'S	REFS	98	DEFINED	94	
540	K2	INTEGER			BODY	REFS	30	59	67	
0	LC12	INTEGER		ARRAY	F.P.	REFS	8		83	
360	MRK	INTEGER			BODY	REFS	90	93	95	
536	N	INTEGER				DEFINED	89		96	
1	NB	INTEGER							97	
154	NBARAY	INTEGER								
310	NBEA	INTEGER								
10	NCARAY	INTEGER								
0	NCNSM	INTEGER								
3	NDATA	INTEGER								
2	NDELT	INTEGER								
4	NOPAN	INTEGER								
510	NP	INTEGER								
72	NSARAY	INTEGER		ARRAY	VARBL'S	REFS	2			
241	PI	REAL		ARRAY	VARBL'S	REFS	2			
10166	PV	REAL		ARRAY	VARBL'S	REFS	2			
3426	P1	REAL		ARRAY	BODY	REFS	2			
5706	P2	REAL		ARRAY	XXX	REFS	12			
0	RO	REAL		ARRAY	XXX	REFS	2			
144	ROP	REAL		ARRAY	VARBL'S	REFS	29			
11626	SDELX	REAL		ARRAY	VARBL'S	REFS	100			
511	SS	REAL			VARBL'S	REFS	51			
326	X	REAL			BODY	REFS	78	79	80	
430	XBO	REAL			XXX	REFS	2			
620	XIU	REAL			XXX	REFS	12			
0	XOC	REAL			VARBL'S	REFS	2			
13266	XO	REAL			VARBL'S	REFS	29			
513	XOO	REAL			VARBL'S	REFS	100			
1146	Y	REAL		ARRAY	BODY	REFS	2			
454	YBO	REAL		ARRAY	BODY	REFS	8			
522	YC	REAL				REFS	51			
525	YCV	REAL				REFS	54			
523	YC1	REAL				REFS	52			
524	YC2	REAL				REFS	53			
0	YS	REAL				REFS	10			
13350	YO	REAL		ARRAY	XYZ	REFS	2			
514	YOO	REAL		ARRAY	VARBL'S	REFS	29			
500	ZBO	REAL		ARRAY	BODY	REFS	102			
526	ZC	REAL				REFS	8			
531	ZCV	REAL				REFS	51			
527	ZC1	REAL				REFS	54			
530	ZC2	REAL				REFS	52			
544	ZS	REAL		ARRAY	XYZ	REFS	53			

SUBROUTINE	GLOBAL	74/74	OPT=1	RELOCATION	VARBL'S	REFS	2	34	36	PAGE
VARIABLES	SN	TYPE				REFS	38	DEFINED	91	4
7	JSPECS	INTEGER				REFS	38	DEFINED	93	
517	J1	INTEGER				REFS	2*99	2*100	2*102	
520	J2	INTEGER				REFS	98			
541	K	INTEGER				DEFINED				
242	KR	INTEGER			VARBL'S	REFS	2			
243	KRDBR	INTEGER			VARBL'S	REFS	2			
537	K1	INTEGER			VARBL'S	REFS	98	DEFINED	94	
540	K2	INTEGER			BODY	REFS	30	59	67	
0	LC12	INTEGER		ARRAY	F.P.	REFS	8		83	
360	MRK	INTEGER			BODY	REFS	90	93	95	
536	N	INTEGER				DEFINED	89		96	
1	NB	INTEGER								
154	NBARAY	INTEGER								
310	NBEA	INTEGER								
10	NCARAY	INTEGER								
0	NCNSM	INTEGER								
3	NDATA	INTEGER								
2	NDELT	INTEGER								
4	NOPAN	INTEGER								
510	NP	INTEGER								
72	NSARAY	INTEGER		ARRAY	VARBL'S	REFS	2			
241	PI	REAL		ARRAY	VARBL'S	REFS	2			
10166	PV	REAL		ARRAY	VARBL'S	REFS	2			
3426	P1	REAL		ARRAY	BODY	REFS	2			
5706	P2	REAL		ARRAY	XXX	REFS	12			
0	RO	REAL		ARRAY	XXX	REFS	2			
144	ROP	REAL		ARRAY	VARBL'S	REFS	29			
11626	SDELX	REAL		ARRAY	VARBL'S	REFS	100			
511	SS	REAL			VARBL'S	REFS	51			
326	X	REAL			BODY	REFS	78	79	80	
430	XBO	REAL			XXX	REFS	2			
620	XIU	REAL			XXX	REFS	12			
0	XOC	REAL			VARBL'S	REFS	2			
13266	XO	REAL			VARBL'S	REFS	29			
513	XOO	REAL			VARBL'S	REFS	100			
1146	Y	REAL		ARRAY	BODY	REFS	2			
454	YBO	REAL		ARRAY	BODY	REFS	8			
522	YC	REAL				REFS	51			
525	YCV	REAL				REFS	54			
523	YC1	REAL				REFS	52			
524	YC2	REAL				REFS	53			
0	YS	REAL				REFS	10			
13350	YO	REAL		ARRAY	XYZ	REFS	2			
514	YOO	REAL		ARRAY	VARBL'S	REFS	29			
500	ZBO	REAL		ARRAY	BODY	REFS	102			
526	ZC	REAL				REFS	8			
531	ZCV	REAL				REFS	51			
527	ZC1	REAL				REFS	54			
530	ZC2	REAL				REFS	52			
544	ZS	REAL		ARRAY	XYZ	REFS	53			

SUBROUTINE	GLOBAL	74/74	OPT=1	RELOCATION	VARBL'S	REFS	2	34	36	PAGE
VARIABLES	SN	TYPE				REFS	38	DEFINED	91	4
7	JSPECS	INTEGER				REFS	38	DEFINED	93	
517	J1	INTEGER				REFS	2*99	2*100	2*102	
520	J2	INTEGER				REFS	98			
541	K	INTEGER				DEFINED				
242	KR	INTEGER			VARBL'S	REFS	2			
243	KRDBR									

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SUBROUTINE GLOBAL    74/74   QPT=1
      115          1CHES , 3(2X,F10.2), /30X, 20HDIHEDRAL IN DEGREES . F10.2)      GLOBAL 116
      116          701 FORMAT (1H1)                                              GLOBAL 117
      117          702 FORMAT (1HO,10X, 11HBODY NUMBER, 14, 30H, APEX COORDINATES IN INC  GLOBAL 118
      118          1HES , 3(2X,F10.2))                                              GLOBAL 119
      119          703 FORMAT ((2X,I4,12(1X,F9.3)))                                         GLOBAL 120
      120          704 FORMAT (1H1)                                              GLOBAL 121
      121          705 FORMAT (1HO,2X,5HPANEL,14, 25HTOTAL DIHEDRAL IN RADIAN, E14.6,//      GLOBAL 122
      122          1X,5HSTRIP,3X,3HXIJ,8X,2HY5,8X,2HZS,5X,5HDELYS,5X,5HDELZS,5X,      GLOBAL 123
      123          6HF GAMMA,//)                                              GLOBAL 124
      124          706 FORMAT ((1HO,3X, 3HBOX, 4X, 1HX,9X,2HX1, 8X,2HX2,8X,2HXV,8X,1HY,9X,      GLOBAL 125
      125          2HY1,8X,2HY2,8X,2HYV,8X,1HZ,8X,2HZ1,8X,2HZ2,8X,2HZV,//)      GLOBAL 126
      126          C
      127          RETURN
      128          END

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SUBROUTINE GLOBAL 74 / 74 O<sub>P</sub>T = 1

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PAGE 2

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```

ZV (J) = ZOO + ZCV*CS + YCV*SS
IF (LC12.EQ.0) GO TO 4
WRITE (ITAPEW,703) J, X(J), Z1(J), Z2(J), EV(J)
      Y(J), P1(J), P2(J), PV(J),
      Z2(J), ZZZ(J), ZV(J)
1      .
2      .
4 CONTINUE
11 = I2 + 1
I2 = I2 + NSRAY(NP) - 1
GMA(NP) = GMA(NP) + GGMA(NP)
IF (LC12.EQ.0) GO TO 12
WRITE (ITAPEW,705) NP, GMA(NP)
12 CONTINUE
DO 5 I = I1,I2
CS = COS (FGGAM (I))
SS = SIN (FGGAM (I))
YC = YS(I)
ZC = ZS(I)
DELYC = DELYS(I)
DELZC = DELZS(I)
XIJ(I) = XOO + XIJ(I)
YS(I) = YOO + YC*CS - ZC*SS
ZS(I) = ZOO + ZC*CS + YC*SS
DELYS(I) = ABS( DELYC*CS - DELZC*SS )
DELZS(I) = ABS( DELYC*SS + DELZC*CS )
FGAMMA(I) = FGGAMMA(I) + FGGMAM(I)
IF (LC12.EQ.0) GO TO 5
WRITE (ITAPEW,703) I, XIJ(I), YS(I), ZS(I), DELYS(I), DELZS(I),
      FGAMMA(I)
1
5 CONTINUE
1 CONTINUE
1 IF (NB.EQ.0) GO TO 10
DO 6 N = 1,NB
1 IF (N.GT.1) GO TO 7
K1 = J2 + 1
GO TO 8
7 K1 = J2 + NBEA(N-1) + 1
8 K2 = J2 + NBEA(N)
XOO = XBO(N)
YOO = YBO(N)
ZOO = ZBO(N)
DO 9 K = K1,K2
X(K) = XOO + X(K)
EV(K) = XOO + EV(K)
Y(K) = YOO + Y(K)
PV(K) = YOO + PV(K)
ZZ(K) = ZOO + ZZ(K)
ZV(K) = ZOO + ZV(K)
9 CONTINUE
WRITE (ITAPEW,702) N, XOO, YOO, ZOO
10 CONTINUE
10 CONTINUE
WRITE (ITAPEW,704)

```

SUBROUTINE GLOBAL 74/74 OPT=1

FTN 4 . 8+577

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PAGE 1

```
1      SUBROUTINE GLOBAL (LC12)
2      COMMON /VARBLS / NCNSM1,NB,INDELT,NDATA,NOPAN,IQ,IR,JSPECs,
3      NCARAY(50),NSARAY(50),NBARY(50),ACAP,B2,FL,PI,
4      KR,KRDBR,GMA(50),X(400),Y(400),Z(400),Z1(400),
5      P1(400),Z21(400),Z2(400),P2(400),Z22(400),
6      EV(400),PV(400),ZV(400),SDEIX(400),DELY(400),
7      X0(50),YO(50),ZO(50),GGMA(50)
8      COMMON/BODY/ RO(100), ROP(100), NBEA(20), BGMA(20), MRK(20,2),
9      XBO(20), YBO(20), ZBO(20)
10     COMMON /XYZ/YS(50),DELYS(50),ZS(50),DELZS(50),FGAMMA(50),
11     CWIG(50), FGGAM(50)
12     COMMON /XXZ/ XOC(400),XIU(50)
13     COMMON /CTAPES / ITAPES
14     DIMENSION ITAPES(50)
15
16     C
17     C
18     ITAPEW = ITAPES(6)
19
20
21     I2 = 0
22     WRITE (ITAPEW,701)
23     DO 1 NP = 1,NOPAN
24     SS = SIN(GGMA(NP))
25     CS = COS(GGMA(NP))
26     XOO = XO(NP)
27     YOO = YO(NP)
28     ZOO = ZO(NP)
29     GGMAS = GGMAS (NP) * 57.29578
30     WRITE (ITAPEW,700) NP, XOO, YOO, ZOO, GGMAS
31     IF (LC12.EQ.0) GO TO 11
32     WRITE (ITAPEW,706)
33     CONTINUE
34     IF (NP.GT.1) GO TO 2
35     J1 = 1
36     GO TO 3
37     J1 = NBARY(NP-1) + 1
38     J2 = NBARY(NP)
39     DO 4 J = J1,J2
40     YC = Y (J)
41     YC1 = P1 (J)
42     YC2 = P2 (J)
43     YCV = PV (J)
44     ZC = ZZ (J)
45     ZC1 = ZZZ (J)
46     ZC2 = ZZZ (J)
47     ZCV = ZV (J)
48     X (J) = XOO + YC *CS - ZC *SS
49     Z1 (J) = XOO + Z1 (J)
50     Z2 (J) = XOO + Z2 (J)
51     EV (J) = XOO + EV (J)
52     P1 (J) = YOO + YC1*CS - ZC1*SS
53     P2 (J) = YOO + YC2*CS - ZC2*SS
54     PV (J) = YOO + YCV*CS - ZCV*SS
55     ZZ (J) = ZOO + ZC *CS + YC *SS
56     ZZ1(J) = ZOO + ZC1*CS + YC1*SS
57     ZZ2(J) = ZOO + ZC2*CS + YC2*SS
58     G1 ORAI
```

SUBROUTINE	MERGE	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE
STATISTICS						3
PROGRAM LENGTH						
CM LABELED COMMON LENGTH		7338	475			
52000B CM USED		136608	6064			

VARIABLES	SN	TYPE	RELOCATION	
104 M	*	INTEGER	VARBL\$	DEFINED 18
1 NB		INTEGER	VARBL\$	REFS 2
154 NBARAY		INTEGER	ARRAY	REFS 2
10 NCARAY		INTEGER	ARRAY	REFS 2
0 NCNSM1		INTEGER	VARBL\$	REFS 2
3 NDATA		INTEGER	VARBL\$	REFS 2
2 NDELT		INTEGER	VARBL\$	REFS 2
100 NINP		INTEGER	F. P.	REFS 22
0 NM		INTEGER	VARBL\$	REFS 18
4 NOPAN		INTEGER	ARRAY	REFS 2
72 NSARAY		INTEGER	VARBL\$	REFS 2
0 NTBOX		INTEGER	F. P.	REFS 11
106 NT1		INTEGER	REAL	REFS 20
241 PI		REAL	ARRAY	REFS 21
10166 PV		REAL	ARRAY	REFS 22
3426 P1		REAL	VARBL\$	REFS 2
5706 P2		REAL	VARBL\$	REFS 2
11626 SDELX		REAL	VARBL\$	REFS 2
3226 X		REAL	ARRAY	REFS 2
107 X1		REAL	ARRAY	REFS 10
13266 XO		REAL	ARRAY	REFS 21
1146 Y		REAL	ARRAY	REFS 22
13350 YO		REAL	ARRAY	REFS 23
11006 ZV		REAL	ARRAY	REFS 2
1766 ZZ		REAL	ARRAY	REFS 2
4246 ZZ1		REAL	ARRAY	REFS 2
6526 ZZ2		REAL	ARRAY	REFS 2
13432 ZO		REAL	ARRAY	REFS 2
2606 Z1		REAL	ARRA'	REFS 2
5066 Z2		REAL	ARRA'	REFS 2
VARIABLES USED AS FILE NAME\$ . SEE ABOVE				
EXTERNALS RNRW		TYPE	ARGS 3	REFERENCES 21
STATEMENT LABELS		DEF LINE	REFERENCES 24	22 23
0 1			18	
0 2			19	
23 1	M	INDEX	FROM-TO 18 24	LENGTH 23B
24 2	I		19 23	PROPERTIES 20B
COMMON BLOCKS VARBL\$	6014	LENGTH	MEMBERS - BIAS NAME(LENGTH)	EXT REFS NOT INNER
		O NCNSM1 (1)	1 NB (1)	2 NDELT (1)
		3 NDATA (1)	4 NOPAN (1)	5 1 Q (1)
		6 IR (1)	7 JSPECS (1)	8 NCARAY (50)
		58 NSARAY (50)	108 NBARAY (50)	158 ACAP (1)
		159 B2 (1)	160 FL (1)	161 PI (1)
		162 KR (1)	163 KRD\$R (1)	164 GMA (50)
		214 X (400)	614 Y (400)	1014 ZZ (400)
		1414 Z1 (400)	1814 P1 (400)	2214 Z21 (400)
		2614 Z2 (400)	3014 P2 (400)	3414 Z22 (400)
		3814 EV (400)	4214 PV (400)	4614 ZV (400)
		5014 SDELX (400)	5414 DELY (400)	5814 XO (50)
		5864 YO (50)	5914 ZO (50)	5964 GGMA (50)
RTADFS		^ RTADFS (50)		

SUBROUTINE MERGE 74/74 OPT=1

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```

1      SUBROUTINE MERGE (NM,NTBOX)
2      COMMON /VARBLS / NCNSM1,NB,NDLT,NDATA,NOPAN,IQ,IR,JSPECs,
3      NCARAY(50),NSRAY(50),ACAP,B2,FL,PI,
4      KR,KRBR,GMA(50),X(400),Y(400),Z(400),
5      P1(400),Z21(400),Z22(400),P2(400),ZZ2(400),
6      EV(400),PV(400),ZV(400),SDELX(400),DELY(400),
7      XO(50),YO(50),ZO(50),GGMA(50)
8
9      COMMON / CTAPES / ITAPES
10     DIMENSION ITAPES(50)
11     DIMENSION XI(400)
12     NINP = NCNSM1 - NTBOX
13     ITAPE = ITAPES(27)
14     ISTAPE = ITAPES(34)
15     INTAPE = ITAPES(35)
16     REWIND ITAPE
17     REWIND ITAPE
18     REWIND INTAPE
19     DO 1 M = 1,NM
20     DO 2 I = 1,3
21     NT1 = NTBOX + 1
22     CALL RNWR (-ISTAPE,XI(1),NTBOX)
23     CALL RNWR (-INTAPE,XI(NT1),NINP)
24     2 CALL RNWR (ITAPE,XI(1),NCNSM1)
25     1 CONTINUE
26     REWIND ITAPE
27     REWIND INTAPE
28     REWIND ITAPE
29     RETURN
30     END

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES	
3	MERGE	1	28	
VARIABLES	SN	TYPE	RELOCATION	
236	ACAP	REAL	VARBLS	REFS 2
237	B2	REAL	VARBLS	REFS 2
12446	DELY	REAL	ARRAY	REFS 2
7346	EV	REAL	ARRAY	REFS 2
240	FL	REAL	VARBLS	REFS 2
13514	GGMA	REAL	ARRAY	REFS 2
244	GMA	REAL	ARRAY	REFS 2
105	I	*	INTEGER	DEFINED 19
103	INTAPE	INTEGER	VARBLS	REFS 2
5	IQ	INTEGER	VARBLS	REFS 2
6	IR	INTEGER	VARBLS	REFS 2
102	ISTAPE	INTEGER	ARRAY	CTAPES 8
101	ITAPE	INTEGER	ARRAY	VARBLS 8
0	ITAPES	INTEGER	VARBLS	REFS 2
7	JSPECs	INTEGER	VARBLS	REFS 2
242	KR	INTEGER	VARBLS	REFS 2

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SUBROUTINE TRIDI

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
22	20	J	5 6	3B	INSTACK
27	30	I	7 12	27B	EXITS NOT INNER
47	30	J	11 12	4B	INSTACK
61	40	I	14 17	17B	NOT INNER
71	40	J	16 17	3B	INSTACK

STATISTICS  
PROGRAM LENGTH  
520000B CM USED

132B 90

SUBROUTINE TRIDI OPT=1

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1

```

1      SUBROUTINE TRIDI ( A,B,C,R,N,M,L,EPS,IN )
2      DIMENSION A(1),B(1),C(1),R(L,1)
3      IND=0
4      IF( ABS(B(1)) .LT. EPS ) GO TO 60
5      DO 20 J=1,M
6      20 R(1,J)=R(1,J)/B(1)
7      DO 30 I=2,N
8      C(I-1)=C(I-1)/B(I-1)
9      B(I)=B(I)-A(I-1)*C(I-1)
10     IF( ABS(B(I)) .LT. EPS ) GO TO 60
11     DO 30 J=1,M
12     30 R(I,J)=(R(I,J)-A(I-1)*R(I-1,J))/B(I)
13     IND=N
14     DO 40 I=2,N
15     40 R(I,I)=R(I,I)-C(I)*R(I+1,I)
16     IND=I-1
17     DO 40 J=1,M
18     40 R(I,J)=R(I,J)-C(I)*R(I+1,J)
19     50 RETURN
20     60 IND=1
21     GO TO 50

```

SYMBOLIC DIFFERENCE MAP (B=2)

ENTRY POINTS	DEF	LINE	REFERENCES
3	1	18	
VARIABLES	SN	TYPE	RELOCATION
O A		REAL	ARRAY F.P.
O B		REAL	ARRAY F.P.
O C		REAL	ARRAY F.P.
O EPS		REAL	ARRAY F.P.
107 I		INTEGER	
110 II		INTEGER	
O IND		INTEGER	
106 J		INTEGER	
O L		INTEGER	
O M		INTEGER	
O N		INTEGER	
O R		REAL	ARRAY F.P.
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE
ABS	REAL	1 INTRIN	6
STATEMENT LABELS			R
O 20			12
O 30			17
O 40			18
100 50			19
101 60			

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SUBROUTINE SPLIT3

OPT=1

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
103	1	1	49 56	14B	OPT
162	6	1	71 72	2B	INSTACK
317	22	1	103 104	3B	INSTACK
332	8	1	111 113	6B	INSTACK

STATISTICS

PROGRAM LENGTH	USED
52000B	422

SUBROUTINE SPLIT3			74/74 OPT=1			RELOCATION			FTN 4.8+577			85/01/23. 08.10.44			PAGE
VARIABLES	SN	TYPE													5
627 SD	REAL														52
620 SR	REAL														101
623 SR1	REAL														
621 S1	REAL														
633 TT1	REAL														
634 TT2	REAL														
0 X	REAL														
EXTERNALS			TYPE	ARGS		REFERENCES			REFERENCES			REFERENCES			
ANDOR	REAL		3	133		75			112	136					
TRIDI			9												
INLINE FUNCTIONS			FUNCTION	TYPE	ARGS	2	INTRIN	DEF LINE	REFERENCES						
AMOD	REAL														
STATEMENT LABELS						DEF LINE	REFERENCES								
0	1					56	49								
342	2					116	82	88	112	136					
370	3					122	4*121								
406	4					124	2*121	2*123							
436	5					126	121	3*123	4*125						
0	6					72	71								
530	7					145	139								
0	8					113	111	112							
331	9					111	110	144							
171	10					75	66	74							
513	16					140	139								
0	19					INACTIVE	78	77							
267	21						98	77							
0	22						104	103							
534	27						147	139							
502	30						139	110	115						
457	33						131	110	112						
0	42						INACTIVE	37	36	36	39				
44	43														
36	44						40	36							
62	45						47	42							
0	52						INACTIVE	58	57						
131	53							61	57						
147	54							67	57						
144	55							64	60						
217	56							83	2*152						
554	90							153	123	2*125	130	152			
235	97							91	84						
230	98							89	77						
552	99							152	123	125	135	138			
17	100							30	29						
323	111							106	29						
165	152							73	70	80	87				
560	999							156	97	112	116	117	105	139	

SUBROUTINE SPLIT3 74/74 OPT=1

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## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES	1	76	156
VARIABLES					
631 AG	REAL	ARRAY	F.P.	RELOCATION	REFS
C AN	REAL	ARRAY	REFS	120	124
636 ANS	REAL	ARRAY	REFS	28	DEFINED 1
			REFS	26	153
			REFS	122	154
			DEFINED	124	155
			REFS	151	155
630 AR	REAL	REFS	150	128	131
625 ARG	REAL	DEFINED	119	124	132
O ARGT	REAL	REFS	116	141	137
O D	REAL	DEFINED	110	142	149
		REFS	112	116	149
		DEFINED	80	117	150
		REFS	87	143	
		REFS	108		
		REFS	26		
		REFS	91		
		REFS	92		
		REFS	102		
		REFS	3*104		
		REFS	3*149		
		REFS	46		
		REFS	47		
		REFS	50		
		REFS	54		
		REFS	55		
		REFS	56		
		REFS	61		
		REFS	62		
		REFS	63		
		REFS	68		
		REFS	72		
		REFS	73		
		REFS	83		
		REFS	89		
		REFS	90		
		REFS	95		
		REFS	96		
		REFS	97		
		REFS	98		
		REFS	99		
		REFS	100		
		REFS	102		
		REFS	111		
		REFS	114		
		REFS	145		
		REFS	83		
		REFS	84		
		REFS	75		
		REFS	76		
		REFS	107		
		REFS	133		
		REFS	4*75		
		REFS	36		
		REFS	44		
		REFS	46		
		REFS	152		
		REFS	121		
		REFS	123		
		REFS	133		
		REFS	29		
		REFS	26		
		REFS	75		
		REFS	3*149		
		REFS	150		
		REFS	1		
		REFS	100		
		REFS	102		
		REFS	111		
		REFS	114		
		REFS	136		
		REFS	137		
		REFS	145		
		REFS	71		
		REFS	78		
		REFS	85		
		REFS	103		
		REFS	104		
		REFS	140		
		REFS	44		
		REFS	45		
		REFS	47		
		REFS	48		
		REFS	50		

SUBROUTINE GENQ 74/74 OPT=1

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```
1      SUBROUTINE GENQ(N4,N5,N6,NRF,JRF,NBE,  
1      KDD02,YIN,ZIN,COEFP,COEFB)  
1      COMMON /VARBLS / NCNSM1,NB, NDELT, NDATA, NOPAN,IQ,IR,JSPECS,  
1      NCARAY(50),NSRAY(50),NBARY(50),ACAP,B2,FL,P1,  
2      KR,KRDBR,GMA(50),X(400),Y(400),Z(400),Z1(400),  
3      P1(400),Z2(400),Z2(400),P2(400),Z2(400),  
4      EV(400),P(400),ZV(400),SDELX(400),DELY(400),  
5      X0(50),YO(50),ZO(50),GGMA(50)  
5      COMMON /CONA / LC(40), CR  
COMMON/BODY/ RO(100), ROP(100), NBEA(20), BGMA(20), MRK(20,2),  
1      XBO(20), YBO(20), ZBO(20)  
DIMENSION NB(80),NARQ(80),LARQ(120,2),YIN(50),ZIN(50),COEFP(50),  
1      COEFB(20),ARQ(120),BQ(400),H(400),DH1(400),DH2(400),  
COMMON /MODE/ NB,NARO,LARQ,ARQ,H,DH1,DH2  
COMMON /CTAPES / ITAPES  
DIMENSION ITAPES(50)  
COMPLEX WQ(400),  
REAL KR,KRDBR  
COMMON/NTPS/ NTP1,NTP2,NTP3,NTP4,NTP5,NTP6,NTP7,NTP8,NTP9,NTP10  
ITAPEW = ITAPES(6)  
MTAP20 = ITAPES(40)  
C  
C  
S      * B2  
BR = CR * 12.0  
IROW = 1  
IF (NB,NE,O,OR,NCORE,GT,KD02,OR,N5,NE,O) IROW=0  
REWIND NTP2  
REWIND NTP3  
REWIND NTP4  
REWIND NTP8  
REWIND NTP10  
REWIND NTP7  
MTAPE = ITAPES(27)  
IF (NB GT, O) REWIND MTAP20  
REWIND MTAPE  
NBOX = NCNSM1  
NTOT = NBOX+NBE  
NTPB = NTP10  
NTPW = NTP4  
II = 0  
IF (NBE,EQ,O) GO TO 51  
NTPB = NTP2  
NTPW = NTP3  
II = MRK(1,1)  
DO 53 K=1,NB  
IF (K,EQ,NB) GO TO 53  
KP1 = K+1  
IF (MRK(KP1,1).GE.MRK(K,1)) GO TO 53  
II = MRK(KP1,1)  
53 CONTINUE  
51 CONTINUE  
IF (II, EQ, O) II=NBOX+1  
IBF = NBOX+1  
IBL = NTOT  
DO 200 J=1,NMD  
READ(MTAPE) (B0(I), I = 1, NBOX)
```

SUBROUTINE GENQ 74/74 OPT=1 FTN 4.8+577 85/01/23. 08. 10. 44 PAGE 2  
 READ(MTAPE) (H(I), I = 1, NBOX) GENQ 59  
 READ(MTAPE) (DH1(I), I = 1, NBOX) GENQ 60  
 WRITE(NTPB) (BQ(I), I = 1, NBOX) GENQ 61  
 IF (J.EQ.1) WRITE(NTPW) NMD GENQ 62  
 DO 187 IW=1,NBOX GENQ 63  
 WQ(IW) = (0.0,0.0) GENQ 64  
 IF (IW.GE.II) GO TO 187 GENQ 65  
 WRE = DH1(IW)  
 WIM = (H(IW)\*KR\*S)/BR GENQ 66  
 WQ(IW) = CMPLX(WRE,WIM) GENQ 67  
 187 CONTINUE GENQ 68  
 WRITE(NTPW) (WQ(I), I=1,NBOX) GENQ 69  
 200 CONTINUE GENQ 70  
 IF (NBE.EQ.0) GO TO 700 GENQ 71  
 REWIND NTPB GENQ 72  
 REWIND NTPW GENQ 73  
 READ(NTPW) NMD GENQ 74  
 DO 600 J=1,NMD GENQ 75  
 READ(NTPB) (BQ(I), I=1,NBOX) GENQ 76  
 READ(NTPW) (WQ(I), I=1,NBOX) GENQ 77  
 CALL AUGW(NMD,NBOX,NBE,NMTB,N4,N6,NRF,JRF,J,COEFB,ASUM) GENQ 78  
 DO 525 IX=1,NBOX GENQ 79  
 WQ(IX) = WQ(IX) + ASUM(IX) GENQ 80  
 525 CONTINUE GENQ 81  
 IF (J.EQ.1) WRITE(NTP4) NMD GENQ 82  
 BACKSPACE NTPB GENQ 83  
 READ(NTP8) (BQ(K), K=IBF,IBL) GENQ 84  
 WRITE(NTP4) (WQ(I), I=1,NBOX) GENQ 85  
 WRITE(NTP10) (BQ(I), I=1,NTOT) GENQ 86  
 600 CONTINUE GENQ 87  
 IF (NCORE.GT.KD02.OR.N5.NE.0) GO TO 770 GENQ 88  
 NTPW = NTP4 GENQ 89  
 700 CONTINUE GENQ 90  
 REWIND NTP3 GENQ 91  
 DO 720 I=1,NBOX GENQ 92  
 REWIND NTPW GENQ 93  
 READ(NTPW) NMD GENQ 94  
 DO 710 J=1,NMD GENQ 95  
 READ(NTPW) (WQ(K), K=1,NBOX) GENQ 96  
 WM(J)= WQ(I) GENQ 97  
 710 CONTINUE GENQ 98  
 WRITE(NTP3) (WM(L), L=1,NMD) GENQ 99  
 720 CONTINUE GENQ 100  
 770 CONTINUE GENQ 101  
 C GENQ 102  
 C GENQ 103  
 RETURN END GENQ 104  
 105 GENQ 105  
 106 GENQ 106

SUBROUTINE	GENQ	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE
ENTRY POINTS	DEF LINE	1	104	REFERENCES		3
VARIABLES	SN	TYPE	RELOCATION	REFS		
236 ACAP	REAL	ARRAY	VARBLS MODE	REFS	12	14
620 ARQ	REAL	ARRAY	REFS	17	78	80
2760 ASUM	COMPLEX	ARRAY	REFS	10	60	86
334 BGMA	REAL	ARRAY	REFS	12	25	DEFINED
500 BQ	REAL	ARRAY	REFS	66	24	57
455 BR	REAL	REAL	REFS	3	24	76
237 B2	REAL	REAL	REFS	12	78	DEFINED
0 COEFFB	REAL	ARRAY	REFS	12	1	1
0 COEFP	REAL	ARRAY	REFS	12	25	DEFINED
50 CR	REAL	REAL	REFS	9	25	59
12446 DELY	REAL	REAL	REFS	3	14	65
1630 DH1	REAL	REAL	REFS	12	14	DEFINED
2450 DH2	REAL	REAL	REFS	12	14	59
7346 EV	REAL	REAL	REFS	3	3	59
240 FL	REAL	REAL	REFS	3	3	59
13514 GGMA	REAL	REAL	REFS	3	3	59
244 GMA	REAL	REAL	REFS	3	3	59
1010 H	REAL	REAL	REFS	12	14	59
472 I	INTEGER	INTEGER	REFS	57	58	59
467 IBF	INTEGER	INTEGER	REFS	86	97	DEFINED
470 IBL	INTEGER	INTEGER	REFS	85	77	57
464 II	INTEGER	INTEGER	REFS	69	77	86
5 IQ	INTEGER	INTEGER	REFS	84	54	59
6 IR	INTEGER	INTEGER	REFS	53	64	DEFINED
456 IROW	INTEGER	INTEGER	REFS	3	3	53
0 ITAPES	INTEGER	INTEGER	REFS	26	27	53
452 ITAPEW	INTEGER	INTEGER	REFS	15	16	53
473 IW	INTEGER	INTEGER	REFS	20	21	53
476 IX	INTEGER	INTEGER	REFS	63	64	53
471 J	INTEGER	INTEGER	REFS	62	65	53
0 JRF	INTEGER	INTEGER	REFS	61	78	53
7 JSPECS	INTEGER	INTEGER	REFS	95	79	53
465 K	INTEGER	INTEGER	REFS	78	82	53
0 KDD2	INTEGER	F.P.	REFS	46	47	53
466 KP1	INTEGER	F.P.	REFS	27	88	DEFINED
242 KR	REAL	VARBLS	REFS	49	50	1
243 KDBR	REAL	VARBLS	REFS	3	18	DEFINED
L	INTEGER	VARBLS	REFS	99	18	48
477 MTAPE	INTEGER	VARBLS	REFS	12	14	66
240 LARQ	INTEGER	ARRAY	REFS	47	48	99
0 LC	INTEGER	ARRAY	REFS	48	49	96
360 MRK	INTEGER	ARRAY	REFS	10	45	96
457 MTAP2O	INTEGER	ARRAY	REFS	12	14	50
120 NARQ	INTEGER	ARRAY	REFS	12	14	57
1 NB	INTEGER	ARRAY	REFS	3	27	58
154 NBARAY	INTEGER	ARRAY	REFS	3	27	58
0 NBE	INTEGER	ARRAY	REFS	38	42	58
310 NBEA	INTEGER	ARRAY	REFS	10	71	58

SUBROUTINE GENQ			74/74	OPT=1		FTN 4.8+577	85/01/23.	08.10.44	PAGE	4
VARIABLES	SN	TYPE	RELOCATION			REFS	38	53	58	59
460	NBOX	INTEGER	ARRAY	VARBL\$	VARBL\$	REFS	62	69	76	85
10	NCARAY	INTEGER		F.P.	VARBL\$	REFS	96	37	77	79
0	NCNSM1	INTEGER		F.P.	VARBL\$	REFS	3	37		
0	NCORE	INTEGER		F.P.	VARBL\$	REFS	27	88	DEFINED	1
3	NDATA	INTEGER		F.P.	VARBL\$	REFS	3			
2	NDELT	INTEGER		F.P.	VARBL\$	REFS	3			
0	NMD	INTEGER		F.P.	VARBL\$	REFS	56	61	75	78
0	NMTB	INTEGER		F.P.	VARBL\$	REFS	1	74	94	95
0	NMTP	INTEGER	*UNUSED	F.P.	VARBL\$	REFS	1	78	DEFINED	1
4	NOPAN	INTEGER		F.P.	VARBL\$	REFS	3			
0	NRF	INTEGER		F.P.	VARBL\$	REFS	78			
72	NSARAY	INTEGER	ARRAY	VARBL\$	VARBL\$	REFS	3			
461	NTOT	INTEGER		F.P.	VARBL\$	REFS	55	86	DEFINED	38
462	NTPB	INTEGER		F.P.	VARBL\$	REFS	39	43	I/O REFS	60
463	NTPW	INTEGER		F.P.	VARBL\$	REFS	40	44	I/O REFS	61
0	NTP1	INTEGER		NTPS	NTPS	REFS	74	77	93	96
11	NTP10	INTEGER		NTPS	NTPS	REFS	19	39	I/O REFS	72
1	NTP2	INTEGER		NTPS	NTPS	REFS	19	43	I/O REFS	76
2	NTP3	INTEGER		NTPS	NTPS	REFS	19	44	I/O REFS	69
3	NTP4	INTEGER		NTPS	NTPS	REFS	19	40	I/O REFS	73
4	NTP5	INTEGER		NTPS	NTPS	REFS	19			
5	NTP6	INTEGER		NTPS	NTPS	REFS	19			
6	NTP7	INTEGER		NTPS	NTPS	REFS	19			
7	NTP8	INTEGER		NTPS	NTPS	REFS	19			
10	NTP9	INTEGER		NTPS	NTPS	REFS	19			
0	N4	INTEGER		F.P.	F.P.	REFS	78			
0	N5	INTEGER		F.P.	F.P.	REFS	27	88	DEFINED	1
0	N6	INTEGER		REAL	REAL	REFS	12			
0	N8	INTEGER		REAL	REAL	REFS	78			
0	N9	INTEGER		REAL	REAL	REFS	3			
241	PI	REAL	ARRAY	ARRAY	VARBL\$	REFS	3			
10166	PV	REAL	REAL	ARRAY	VARBL\$	REFS	3			
3426	P1	REAL	REAL	ARRAY	VARBL\$	REFS	3			
5706	P2	REAL	REAL	ARRAY	VARBL\$	REFS	3			
0	RO	REAL	REAL	ARRAY	BODY	REFS	10			
144	ROP	REAL	REAL	ARRAY	BODY	REFS	10			
454	S	REAL	REAL	REAL	ARRAY	REFS	66			
11626	SDELX	REAL	REAL	REAL	ARRAY	REFS	3			
475	WIM	REAL	REAL	REAL	ARRAY	REFS	67			
1320	WQ	COMPLEX	COMPLEX	COMPLEX	ARRAY	REFS	63	67	DEFINED	65
474	WRE	REAL	REAL	REAL	ARRAY	REFS	17	99	DEFINED	97
4420	WW	REAL	REAL	REAL	ARRAY	REFS	67			
326	X	REAL	REAL	REAL	ARRAY	REFS	3			
430	XBO	REAL	REAL	REAL	ARRAY	REFS	10			
13266	XO	REAL	REAL	REAL	ARRAY	REFS	3			
1146	Y	REAL	REAL	REAL	ARRAY	REFS	3			
454	YBO	REAL	REAL	REAL	ARRAY	REFS	10			
0	YIN	REAL	REAL	REAL	ARRAY	REFS	12			
13350	YO	REAL	REAL	REAL	ARRAY	REFS	3			
500	ZBO	REAL	REAL	REAL	ARRAY	REFS	10			
0	ZIN	REAL	REAL	REAL	ARRAY	REFS	12			
11006	ZV	REAL	REAL	REAL	ARRAY	REFS	3			
1766	ZV	REAL	REAL	REAL	ARRAY	REFS	3			

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VARIABLES	SN	TYPE	RELOCATION			
4246 221	REAL	ARRAY	VARBLS	REFS 3		
6526 222	REAL	ARRAY	VARBLS	REFS 3		
13432 20	REAL	ARRAY	VARBLS	REFS 3		
2606 21	REAL	ARRAY	VARBLS	REFS 3		
5066 22	REAL	ARRAY	VARBLS	REFS 3		
VARIABLES USED AS FILE NAMES. SEE ABOVE						
EXTERNALS	TYPE	ARGS	REFERENCES			
AUGW		11	78			
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES		
CMPLX COMPLEX	COMPLEX	2	INTRIN	67		
STATEMENT LABELS		DEF LINE	REFERENCES			
76 51	K	52	42			
74 53	J	51	46	49		
151 187	IW	68	62	64		
0 200	J	70	56			
0 525	I	81	79			
0 600	I	87	75			
272 700	I	90	71			
0 710	J	98	95			
0 720	J	100	92			
326 770	J	101	88			
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
66 53	K	46 51	78	INSTACK	EXT REFS	NOT INNER
105 200	J	56 70	57B	OPT	EXT REFS	NOT INNER
141 187	IW	62 68	12B	INSTACK	EXT REFS	NOT INNER
174 600	J	75 87	70B	INSTACK	EXT REFS	NOT INNER
225 525	I	79 81	4B	INSTACK	EXT REFS	NOT INNER
275 720	I	92 100	31B	INSTACK	EXT REFS	NOT INNER
302 710	J	95 98	14B	INSTACK	EXT REFS	NOT INNER
COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME (LENGTH)				
VARBLS	6014	O NCNSM1 (1)		1 NB (1)	2 NDELT (1)	
		3 NDATA (1)		4 NOPAN (1)	5 IQ (1)	
		6 I R (1)		7 JSPECS (1)	8 NCARAY (50)	
		58 NSARAY (50)		10B NBARAY (50)	158 ACAP (1)	
		159 B2 (1)		160 FL (1)	161 PI (1)	
		162 KR (1)		163 KDRBR (1)	164 GMA (50)	
		214 X (400)		614 Y (400)	1014 ZZ (400)	
		1414 Z1 (400)		1814 P1 (400)	2214 ZZ1 (400)	
		2614 Z2 (400)		3014 P2 (400)	3414 ZZ2 (400)	
		3814 EV (400)		4214 PV (400)	4614 ZV (400)	
		5014 SDELX (400)		5414 DELY (400)	5814 XO (50)	
		5864 YO (50)		5914 ZO (50)	5964 GGMA (50)	
COMA BODY	41 340	O LC (40)		40 CR (1)		
MODE	1720	O RO (100)		100 ROP (100)	200 NBEA (20)	
CTAPES NTPS	50 10	220 BGMA (20)		240 MRK (40)	280 XBO (20)	
		300 YBO (20)		320 ZBO (20)		
		0 NB (80)		80 NARQ (80)		
		400 ARQ (120)		520 H (400)		
		1320 DH2 (400)				
		0 ITAPES (50)				
		O NTP1 (1)		1 NTP2 (1)	2 NTP3 (1)	
		3 NTP4 (1)		4 NTP5 (1)	5 NTP6 (1)	

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COMMON BLOCKS   LENGTH      MEMBERS - BIAS NAME(LENGTH)

6	NTP7	(1)
9	NTP10	(1)

STATISTICS

PROGRAM LENGTH	45558	2413
CM LABELED COMMON LENGTH	177578	8175
52000B CM USED		

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8 NTP9    (1)

7 NTP8    (1)

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8 NTP9    (1)

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 COMMON /VARBLS/ NCNSM1,NB, NDELT, NDATA, NOPAN, IQ, IR, JSPECS,  
 1 NCARAY(50), NSARAY(50), NBARAY(50), ACAP, B2, F2, PI,  
 2 KR, KRD BR, GMA(50), X(400), Y(400), Z(400), Z1(400),  
 3 P1(400), P2(400), Z2(400), P2(400), Z2(400),  
 4 EV(400), PV(400), ZV(400), SDEIX(400), DELY(400),  
 5 XO(50), Y(50), Z(50), GGMA(50)  
 COMMON/NTPS/ NTP1,NTP2,NTP3,NTP4,NTP5,NTP6,NTP7,NTP8,NTP9,NTP10  
 COMMON/BODY/ RO(100), ROP(100), NBEA(20), BGMA(20), MRK(20,2),  
 1 XBO(20), YBO(20), ZBO(20)  
 C DIMENSION NB(80) NARQ(80) LARQ(120,2)  
 1 COEFB(20), ARQ(120), BB(400), H(400), DH1(400), DH2(400)  
 15 DIMENSION VBO(30), RVBO(15)  
 DIMENSION ITAPES(50)  
 C COMMON /MODE/ NB,NARQ,LARQ,ARQ,H,DH1,DH2  
 COMMON /PLUTAN/ FMACH,BETA,VBO,RVBO,NRVBO  
 20 COMMON /CTAPES/ ITAPES  
 COMMON /COMA/ LC(40), CR  
 COMPLEX AZY(100), DCP(100), WJ(100), WJP(100), ASUM(400), SUM  
 COMPLEX TRM1, TRM2, TRM3  
 25 C REAL KR,KRD BR,KKR,KKI  
 C ITAPEW = ITAPES(6)  
 C BR = FL/2.0  
 30 S = B2  
 EPS = 0.001  
 REWIND NTPB  
 MTAPE = ITAPES(40)  
 NBEL = NBEA(NB)  
 READ (MTAPE) (BB(11), II=1, NBEL)  
 READ (MTAPE) (H(11), II=1, NBEL)  
 READ (MTAPE) (DH1(11), II=1, NBEL)  
 READ (MTAPE) (DH2(11), II=1, NBEL)  
 WRITE (ITAPEW,37) NBE,J  
 WRITE (ITAPEW,45) (BB(KX), KX=1, NBE)  
 WRITE (NTPB) (BB(KX), KX=1, NBE)  
 DO 187 IW=1, NBE  
 WRE = OH(IW)  
 45 WIM = (H(IW)\*KR\*S)/BR  
 WREP = CMPLX(WRE,WIM)  
 WREP = DH2(IW)  
 WIMP = DH1(IW)\*KR/BR  
 WJP(IW) = CMPLX(WREP,WIMP)  
 TRM1 = 2.0\*ROP(IW)\*WJ(IW)  
 TRM2 = R0(IW)\*WJP(IW)  
 TRM3 = KR\*RO(IW)/BR  
 TRM3 = (CMPLX(0.0,TRM3I))\*WJ(IW)  
 DCP(IW) = PI\*(TRM1+TRM2+TRM3)  
 50 187 CONTINUE  
 55 WRITE (ITAPEW,40) NBE,J  
 56 AUGW 57  
 57

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      WRITE (JTAPEW,50) NBE,J          59
      WRITE (JTAPEW,45) (WJP(KX), KX=1,NBE)   AUGW
      WRITE (JTAPEW,64) J                60
      WRITE (JTAPEW,45) (DCP(K), K=1,NBE)   AUGW
      WRITE (NTP7) (DCP(K), K=1,NBE)   AUGW
      NPAN = 1                           AUGW
      DO 600 I=1,NBOX                  61
      SUM = (0.0,0.0)                  AUGW
      ASUM(I) = (0.0,0.0)              62
      NBODY= 1                         AUGW
      NFRN = NREA(NBODY)               63
      KF = NBOX                        AUGW
      DO 400 K=1,NBE                  64
      MARK1= MK(NBODY,1)               AUGW
      MARK2= MK(NBODY,2)               AUGW
      AZY(K) = (0.0,0.0)               AUGW
      KF = KF + 1                     AUGW
      IF (I.GE.MARK1 .AND. I.LE.MARK2) GO TO 375 65
      X0 = X(1) - EV(KF)             AUGW
      YO = Y(1) - PV(KF)             66
      ZO = ZZ(1) - ZV(KF)            AUGW
      EE = RO(K)                      67
      E2 = EE*EE                      AUGW
      GAMS = GMANPAN                  68
      GAMSIG = BGMA(NBODY)            AUGW
      XKFR = SDEIX(KF)*RO(K)/(2.0*PI) 69
      XKR = O.O                        AUGW
      XKI = O.O                        70
      IGO = 1                          AUGW
      FLAGM = 1.0                      AUGW
      365 CONTINUE
      CALL TKER (X0,Y0,ZO,KR,BR,GAMS,GAMSIG,FMACH,E2,KKR,KKI) 71
      XKR = XKR + KKR*FLAGM           AUGW
      XKI = XKI + KKI*FLAGM           72
      GO TO (366,367,368,369).IGO    AUGW
      366 CONTINUE
      IF (NDELT.EQ.0.OR.(ABS(PV(KF)).LE.EPS)) GO TO 367 73
      YO = Y(1) + PV(KF)              AUGW
      GAMSIG = -BGMA(NBODY)            74
      IGO = 2                          AUGW
      FLAGM= FLOAT(NDELT)             AUGW
      GO TO 365                        AUGW
      367 CONTINUE
      IF (JSPECS.EQ.0.OR.(ABS(ZV(KF))).LE.EPS) GO TO 369 75
      YO = Y(1) - PV(KF)              AUGW
      ZO = ZZ(1) + ZV(KF)              76
      GAMSIG = -BGMA(NBODY)            AUGW
      IGO = 3                          AUGW
      FLAGM= FLOAT(JSPECS)            77
      GO TO 365                        AUGW
      368 CONTINUE
      IF (NDELT.EQ.0.OR.(ABS(PV(KF))).LE.EPS) GO TO 369 78
      YO = Y(1) + PV(KF)              AUGW
      GAMSIG = BGMA(NBODY)             79
      IGO = 4                          AUGW
      FLAGM= FLOAT(NDELT)*FLOAT(JSPECS) 80
      GO TO 365                        AUGW
  
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115      369 CONTINUE
          XKR = XKR * XKER
          XKI = XKI * XKER
          AZY(K) = CMPLX(XKR , XKI)
375      CONTINUE
          SUM = SUM + AZY(K)*DCP(K)
          IF (K.NE.NFRN) GO TO 400
          NBODY = NBODY+1
          NFRN = NBEA(NBODY)

400      CONTINUE
          ASUM(I) = SUM
          IF (N4.EQ.0) GO TO 405
          WRITE (ITAPEW,66) I,NBE
          WRITE (ITAPEW,45) (AZY(K), K=1,NBE)

405      CONTINUE
          IF (I.EQ.NBARAY(NPAN)) NPAN=NPAN+1
600      CONTINUE
          WRITE (ITAPEW,68) J
          WRITE (ITAPEW,45) (ASUM(I), I=1,NBOX)

C      C FORMATS
C      37 FORMAT (1HO,25X,3HTHE,14,31H B-MATRIX ELEMENTS FOR MODE NO.,I4)
        40 FORMAT (1HO,25X,3HTHE,14,32H WJ MATRIX ELEMENTS FOR MODE NO.,I4)
        45 FORMAT (1HO,6E17.8)
        50 FORMAT (1HO,25X,3HTHE,14,31H WJ-PRIME ELEMENTS FOR MODE NO.,I4)
        64 FORMAT (1HO, 8HCOL. NO.,I4,18H OF DEL-CP MATRIX//)
        66 FORMAT (1HO,10X,7HROW NO.,I4,7H OF THE,I4,17H APZ-APY ELEMENT: ')
        68 FORMAT (1HO,10X,1OHCOLUMN NO.,I4,19H OF THE AUGW MATRIX//)

135      C      RETURN
          END

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## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES						
3 AUGW	1	146						
236 ACAP	REAL	ARRAY	REFS	13	133	DEFINED	1	66
620 ARQ	REAL	ARRAY	REFS	23	120	DEFINED	128	125
0 ASUM	COMPLEX	ARRAY	REFS	23	120	DEFINED	73	118
1503 AZY	COMPLEX	ARRAY	REFS	13	4	DEFINED	42	36
663 BB	REAL	ARRAY	REFS	19				
1 BETA	REAL	FLUTAN	REFS	10	82			
334 BGMA	REAL	BODY	REFS	45	48	DEFINED	52	30
622 BR	REAL	REFS		3	31			
237 B2	REAL	VARBLS	REFS	13	DEFINED	1		
0 COEFB	REAL	F.P.	REFS	21				
50 CR	REAL	COMA	REFS	23	61	DEFINED	62	54
2013 DCP	COMPLEX	ARRAY	REFS	3				
12446 DELY	REAL	VARBLS	REFS					

SUBROUTINE	AUGW	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23.	08.10.44	PAGE
VARIABLES	SN	TYPE		ARRAY MODE	13	18	44	38
1630	DH1	REAL		ARRAY MODE	13	18	47	39
2450	DH2	REAL		ARRAY MODE	REFS 2*80	DEFINED 94	48	39
652	EE	REAL		ARRAY	REFS 101	DEFINED 109	DEFINED	32
624	SPS	REAL		VARBLS	REFS 3	76		
7346	EV	REAL		ARRAY	REFS 89	DEFINED 80		
653	E2	REAL		VARBLS	REFS 3	30		
240	FL	REAL		VARBLS	REFS 90	91	DEFINED	87
662	FLAGM	REAL		FLUTAN	REFS 19	89		106
0	FMACh	REAL		ARRAY	REFS 89	DEFINED 81	98	113
654	GAMS	REAL		ARRAY	REFS 89	DEFINED 82	96	102
655	GAMSIG	REAL		ARRAY	REFS 3	3		111
13514	GGMA	REAL		ARRAY	REFS 13	18	DEFINED	37
244	GMA	REAL		ARRAY	REFS 66	2*75	76	95
1010	H	REAL		ARRAY	REFS 66	125	77	102
641	I	INTEGER		MODE	REFS 110	127	130	111
661	IGO	INTEGER		103	REFS 64	133	133	
627	II	INTEGER		DEFINED	REFS 92	97	DEFINED	112
5	IQ	INTEGER		REFS 36	37	39	36	37
6	IR	INTEGER		REFS 38	39			
0	ITAPES	INTEGER		VARBLS	REFS 3			
621	ITAPEW	INTEGER		VARBLS	REFS 16			
631	IW	INTEGER		CTAPES	REFS 28	20	28	58
0	J	INTEGER		DEFINED	REFS 60	61	40	58
0	JRF	INTEGER	*UNUSED	F.P.	REFS 44	45	46	2*50
7	JSPECS	INTEGER		VARBLS	REFS 2*51	52	53	
637	K	INTEGER		DEFINED	REFS 40	56	54	
644	KF	INTEGER		DEFINED	REFS 1		47	
620	KK1	REAL		REFS 3	101	106	113	
617	KKR	REAL		REFS 61	62	73	83	58
242	KR	REAL		REFS 121	74	76	62	133
243	KRDBR	REAL		REFS 101	102	103	77	49
630	XX	INTEGER		REFS 26	89	91	78	95
240	LARQ	INTEGER		REFS 26	89	90	83	74
0	LC	INTEGER		REFS 3	26	45	89	
645	MARK1	INTEGER		REFS 41	42	57	59	
646	MARK2	INTEGER		REFS 57	59	59	59	
360	MRK	INTEGER		REFS 13	10	106	118	
625	MTAPE	INTEGER		BODY	REFS 75	75	DEFINED	2*120
120	NARQ	INTEGER		MODE	REFS 75	76	61	
1	NB	INTEGER		VARBLS	REFS 13	71	72	
154	NBARAY	INTEGER		VARBLS	REFS 3	18	77	
0	NBE	INTEGER		F.P.	REFS 130	35	35	
310	NBEA	INTEGER		DEFINED	REFS 40	41	42	
626	NBEL	INTEGER		REFS 59	61	62	48	
642	NBODY	INTEGER		BODY	REFS 36	37	38	57

SUBROUTINE	AUGW	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23.	08.10.44	PAGE
VARIABLES	SN	TYPE		ARRAY MODE	REFS 13	18	44	38
1630	DH1	REAL		ARRAY MODE	REFS 13	18	47	39
2450	DH2	REAL		ARRAY MODE	REFS 2*80	DEFINED 94	48	39
652	EE	REAL		ARRAY	REFS 94	101	DEFINED	32
624	SPS	REAL		VARBLS	REFS 3	76		
7346	EV	REAL		ARRAY	REFS 89	DEFINED 80		
653	E2	REAL		VARBLS	REFS 3	30		
240	FL	REAL		VARBLS	REFS 90	91	DEFINED	87
662	FLAGM	REAL		FLUTAN	REFS 19	89		106
0	FMACh	REAL		ARRAY	REFS 89	DEFINED 81	98	113
654	GAMS	REAL		ARRAY	REFS 89	DEFINED 82	96	102
655	GAMSIG	REAL		ARRAY	REFS 3	3		111
13514	GGMA	REAL		ARRAY	REFS 13	18	DEFINED	37
244	GMA	REAL		ARRAY	REFS 66	2*75	76	95
1010	H	REAL		ARRAY	REFS 66	125	77	102
641	I	INTEGER		MODE	REFS 110	127	130	111
661	IGO	INTEGER		103	REFS 64	133	133	
627	II	INTEGER		DEFINED	REFS 92	97	DEFINED	112
5	IQ	INTEGER		REFS 36	37	39	36	37
6	IR	INTEGER		REFS 38	39			
0	ITAPES	INTEGER		VARBLS	REFS 3			
621	ITAPEW	INTEGER		VARBLS	REFS 16			
631	IW	INTEGER		CTAPES	REFS 28	20	28	58
0	J	INTEGER	*UNUSED	F.P.	REFS 60	61	40	58
0	JRF	INTEGER	INTEGER	VARBLS	REFS 44	52	53	43
7	JSPECS	INTEGER	INTEGER	DEFINED	REFS 40	56	54	43
637	K	INTEGER	INTEGER	DEFINED	REFS 1		47	132
644	KF	INTEGER		REFS 121	74	76	77	
620	KK1	REAL		REFS 101	102	103	110	DEFINED
617	KKR	REAL		REFS 26	89	91	90	69
242	KR	REAL		REFS 26	89	90	83	94
243	KRDBR	REAL		REFS 41	42	57	59	74
630	XX	INTEGER		REFS 57	59	59	59	
240	LARQ	INTEGER		REFS 13	18			
0	LC	INTEGER		REFS 21				
645	MARK1	INTEGER		REFS 75				
646	MARK2	INTEGER		REFS 75				
360	MRK	INTEGER		REFS 10				
625	MTAPE	INTEGER		BODY	REFS 71			
120	NARQ	INTEGER		MODE	REFS 72			
1	NB	INTEGER		VARBLS	REFS 13			
154	NBARAY	INTEGER		VARBLS	REFS 3			
0	NBE	INTEGER		F.P.	REFS 130			
310	NBEA	INTEGER		DEFINED	REFS 40			
626	NBEL	INTEGER		REFS 59				
642	NBODY	INTEGER		BODY	REFS 36			

SUBROUTINE	AUGW	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23.	08.10.44	PAGE
VARIABLES	SN	TYPE		ARRAY MODE	REFS 13	18	44	38
1630	DH1	REAL		ARRAY MODE	REFS 13	18	47	39
2450	DH2	REAL		ARRAY MODE	REFS 2*80	DEFINED 94	48	39
652	EE	REAL		ARRAY	REFS 94	101	DEFINED	32
624	SPS	REAL		VARBLS	REFS 3	76		
7346	EV	REAL		ARRAY	REFS 89	DEFINED 80		
653	E2	REAL		VARBLS	REFS 3	30		
240	FL	REAL		VARBLS	REFS 90	91	DEFINED	87
662	FLAGM	REAL		FLUTAN	REFS 19	89		106
0	FMACh	REAL		ARRAY	REFS 89	DEFINED 81	98	113
654	GAMS	REAL		ARRAY	REFS 89	DEFINED 82	96	102
655	GAMSIG	REAL		ARRAY	REFS 3	3		111
13514	GGMA	REAL		ARRAY	REFS 13	18	DEFINED	37
244	GMA	REAL		ARRAY	REFS 66	2*75	76	95
1010	H	REAL		ARRAY	REFS 66	125	77	102
641	I	INTEGER		MODE	REFS 110	127	130	111
661	IGO	INTEGER		103	REFS 64	133	133	
627	II	INTEGER		DEFINED	REFS 92	97	DEFINED	112
5	IQ	INTEGER		REFS 36	37	39	36	37
6	IR	INTEGER		REFS 38	39			
0	ITAPES	INTEGER		VARBLS	REFS 3			
621	ITAPEW	INTEGER		VARBLS	REFS 16			
631	IW	INTEGER		CTAPES	REFS 28	20	28	58
0	J	INTEGER	*UNUSED	F.P.	REFS 60	61	40	58
0	JRF	INTEGER	INTEGER	VARBLS	REFS 44	52	53	43
7	JSPECS	INTEGER	INTEGER	DEFINED	REFS 40	56	54	43
637	K	INTEGER	INTEGER	DEFINED	REFS 1		47	132
644	KF	INTEGER		REFS 121	74	76	77	
620	KK1	REAL		REFS 101	102	103	110	DEFINED
617	KKR	REAL		REFS 26	89	91	90	69
242	KR	REAL		REFS 26	89	90	83	94
243	KRDBR	REAL		REFS 41	42	57	59	74
630	XX	INTEGER		REFS 57	59	59	59	
240	LARQ	INTEGER		REFS 13	18			
0	LC	INTEGER		REFS 21				
645	MARK1	INTEGER		REFS 75				
646	MARK2	INTEGER		REFS 75				
360	MRK	INTEGER		REFS 10				
625	MTAPE	INTEGER		BODY	REFS 71			
120	NARQ	INTEGER		MODE	REFS 72			
1	NB	INTEGER		VARBLS	REFS 13			
154	NBARAY	INTEGER		VARBLS	REFS 3			
0	NBE	INTEGER		F.P.	REFS 130			
310	NBEA	INTEGER		DEFINED	REFS 40			
626	NBEL	INTEGER		REFS 59				
642	NBODY	INTEGER		BODY	REFS 36			

SUBROUTINE	AUGW	74/74	OPT=1	RELOCATION						
VARIABLES				F.P.						
0 NBOX	INTEGER	ARRAY		VARBL\$	REFS	64	69	133	DEFINED	1
10 NCARAY	INTEGER	ARRAY		VARBL\$	REFS	3				
0 NCNSM <sup>1</sup>	INTEGER	ARRAY		VARBL\$	REFS	3				
3 NDATA	INTEGER	ARRAY		VARBL\$	REFS	3				
2 NDELT	INTEGER	ARRAY		VARBL\$	REFS	3				
643 NFRN	INTEGER	ARRAY		VARBL\$	REFS	3				
0 NMD	INTEGER	*UNUSED	F.P.	FLUTAN	DEFINED	121	94	98	109	113
0 NMFB	INTEGER	*UNUSED	F.P.	VARBL\$	DEFINED	1	68	123		
4 NOPAN	INTEGER	*UNUSED	F.P.	NTPS	REFS	3				
640 NPAN	INTEGER	*UNUSED	F.P.	NTPS	REFS	81	2*130	DEFINED	63	130
0 NRF	INTEGER	*UNUSED	F.P.	NTPS	REFS	1				
57 NRVBO	INTEGER	ARRAY		NTPS	REFS	19				
72 NSARAY	INTEGER	ARRAY		NTPS	REFS	3				
0 NTP1	INTEGER	ARRAY		NTPS	REFS	9				
11 NTP10	INTEGER	ARRAY		NTPS	REFS	9				
1 NTP2	INTEGER	ARRAY		NTPS	REFS	9				
2 NTP3	INTEGER	ARRAY		NTPS	REFS	9				
3 NTP4	INTEGER	ARRAY		NTPS	REFS	9				
4 NTP5	INTEGER	ARRAY		NTPS	REFS	9				
5 NTP6	INTEGER	ARRAY		NTPS	REFS	9				
6 NTP7	INTEGER	ARRAY		NTPS	REFS	9				
7 NTP8	INTEGER	ARRAY		NTPS	REFS	9				
10 NTP9	INTEGER	ARRAY		NTPS	REFS	9				
0 N4	INTEGER	*UNUSED	F.P.	NTPS	REFS	9				
0 N6	INTEGER	*UNUSED	F.P.	MODE	DEFINED	126	1			
0 N8	REAL	ARRAY		VARBL\$	REFS	13	18			
241 P1	REAL	ARRAY		VARBL\$	REFS	3	54	83		
10166 PV	REAL	ARRAY		VARBL\$	REFS	3	77	94		
3426 P1	REAL	ARRAY		VARBL\$	REFS	3				
5706 P2	REAL	ARRAY		VARBL\$	REFS	3				
40 RVBO	REAL	ARRAY		FLUTAN	REFS	15	19			
0 RO	REAL	ARRAY		BODY	REFS	10	51	52		
144 ROP	REAL	ARRAY		BODY	REFS	10	50	79		
623 S	REAL	ARRAY		VARBL\$	REFS	45	DEFINED	31		
11626 SDELX	REAL	ARRAY		COMPLEX	REFS	3	83			
607 SUM	COMPLEX	ARRAY		COMPLEX	REFS	23	120	125	DEFINED	65
611 TRM1	COMPLEX	ARRAY		COMPLEX	REFS	24	54	54	DEFINED	50
613 TRM2	COMPLEX	ARRAY		COMPLEX	REFS	24	54	54	DEFINED	51
615 TRM3	COMPLEX	ARRAY		REAL	REFS	24	54	54	DEFINED	53
636 TRM31	REAL	ARRAY		FLUTAN	REFS	53	DEFINED	52		
2 VBO	REAL	ARRAY		VBO	REFS	15	19			
633 W/M	REAL	ARRAY		W/M	REFS	46	DEFINED	45		
635 WIMP	REAL	ARRAY		WIMP	REFS	49	DEFINED	48		
2323 WJ	COMPLEX	ARRAY		WJ	REFS	23	50	53	DEFINED	46
2633 WJP	COMPLEX	ARRAY		WJP	REFS	23	51	59	DEFINED	49
632 WRE	REAL	ARRAY		WRE	REFS	46	DEFINED	44		
634 WREP	REAL	ARRAY		WREP	REFS	49	DEFINED	47		
326 X	REAL	ARRAY		X	REFS	3	76			
430 XBO	REAL	ARRAY		XBO	REFS	10				
656 XKER	REAL	ARRAY		XKER	REFS	116	117	118	DEFINED	83
660 XKI	REAL	ARRAY		XKI	REFS	91	117	118	DEFINED	85
657 XKR	REAL	ARRAY		XKR	REFS	90	116	118	DEFINED	84
13266 XO	REAL	ARRAY		XO	REFS	3				
647 XO	REAL	ARRAY		XO	REFS	89	DEFINED	76		
1146 Y	REAL	ARRAY		Y	REFS	3	77	95	DEFINED	110
454 YBO	REAL	ARRAY		YBO	REFS	10				
13750 VN				VN	REFS	2				

SUBROUTINE	AUGW	74/74	OPT=1	RELOCATION						
VARIABLES				F.P.						
0 NBOX	INTEGER	ARRAY		VARBL\$	REFS	64	69	133	DEFINED	1
10 NCARAY	INTEGER	ARRAY		VARBL\$	REFS	3				
0 NCNSM <sup>1</sup>	INTEGER	ARRAY		VARBL\$	REFS	3				
3 NDATA	INTEGER	ARRAY		VARBL\$	REFS	3				
2 NDELT	INTEGER	ARRAY		VARBL\$	REFS	3				
643 NFRN	INTEGER	ARRAY		VARBL\$	REFS	3				
0 NMD	INTEGER	*UNUSED	F.P.	FLUTAN	DEFINED	121	94	98	109	113
0 NMFB	INTEGER	*UNUSED	F.P.	VARBL\$	DEFINED	1	68	123		
4 NOPAN	INTEGER	*UNUSED	F.P.	NTPS	REFS	3				
640 NPAN	INTEGER	*UNUSED	F.P.	NTPS	REFS	81	2*130	DEFINED	63	130
0 NRF	INTEGER	*UNUSED	F.P.	NTPS	REFS	1				
57 NRVBO	INTEGER	ARRAY		NTPS	REFS	19				
72 NSARAY	INTEGER	ARRAY		NTPS	REFS	3				
0 NTP1	INTEGER	ARRAY		NTPS	REFS	9				
11 NTP10	INTEGER	ARRAY		NTPS	REFS	9				
1 NTP2	INTEGER	ARRAY		NTPS	REFS	9				
2 NTP3	INTEGER	ARRAY		NTPS	REFS	9				
3 NTP4	INTEGER	ARRAY		NTPS	REFS	9				
4 NTP5	INTEGER	ARRAY		NTPS	REFS	9				
5 NTP6	INTEGER	ARRAY		NTPS	REFS	9				
6 NTP7	INTEGER	ARRAY		NTPS	REFS	9				
7 NTP8	INTEGER	ARRAY		NTPS	REFS	9				
10 NTP9	INTEGER	ARRAY		NTPS	REFS	9				
0 N4	INTEGER	*UNUSED	F.P.	NTPS	REFS	9				
0 N6	INTEGER	*UNUSED	F.P.	MODE	DEFINED	126	1			
0 N8	REAL	ARRAY		VARBL\$	REFS	13	18			
241 P1	REAL	ARRAY		VARBL\$	REFS	3	54	83		
10166 PV	REAL	ARRAY		VARBL\$	REFS	3	77	94		
3426 P1	REAL	ARRAY		VARBL\$	REFS	3				
5706 P2	REAL	ARRAY		VARBL\$	REFS	3				
40 RVBO	REAL	ARRAY		FLUTAN	REFS	15	19			
0 RO	REAL	ARRAY		BODY	REFS	10	51	52		
144 ROP	REAL	ARRAY		BODY	REFS	10	50	79		
623 S	REAL	ARRAY		VARBL\$	REFS	45	DEFINED	31		
11626 SDELX	REAL	ARRAY		COMPLEX	REFS	3	83			
607 SUM	COMPLEX	ARRAY		COMPLEX	REFS	23	120	125	DEFINED	65
611 TRM1	COMPLEX	ARRAY		COMPLEX	REFS	24	54	54	DEFINED	50
613 TRM2	COMPLEX	ARRAY		COMPLEX	REFS	24	54	54	DEFINED	51
615 TRM3	COMPLEX	ARRAY		REAL	REFS	24	54	54	DEFINED	53
636 TRM31	REAL	ARRAY		FLUTAN	REFS	53	DEFINED	52		
2 VBO	REAL	ARRAY		VBO	REFS	15	19			
633 W/M	REAL	ARRAY		W/M	REFS	46	DEFINED	45		
635 WIMP	REAL	ARRAY		WIMP	REFS	49	DEFINED	48		
2323 WJ	COMPLEX	ARRAY		WJ	REFS	23	50	53	DEFINED	46
2633 WJP	COMPLEX	ARRAY		WJP	REFS	23	51	59	DEFINED	49
632 WRE	REAL	ARRAY		WRE	REFS	46	DEFINED	44		
634 WREP	REAL	ARRAY		WREP	REFS	49	DEFINED	47		
326 X	REAL	ARRAY		X	REFS	3	76			
430 XBO	REAL	ARRAY		XBO	REFS	10				
656 XKER	REAL	ARRAY		XKER	REFS	116	117	118	DEFINED	83
660 XKI	REAL	ARRAY		XKI	REFS	91	117	118	DEFINED	85
657 XKR	REAL	ARRAY		XKR	REFS	90	116	118	DEFINED	84
13266 XO	REAL	ARRAY		XO	REFS	3				
647 XO	REAL	ARRAY		XO	REFS	89	DEFINED	76		
1146 Y	REAL	ARRAY		Y	REFS	3	77	95	DEFINED	110
454 YBO	REAL	ARRAY		YBO	REFS	10				
13750 VN				VN	REFS	2				

SUBROUTINE	AUGW	74/74	OPT=1	RELOCATION						
VARIABLES				F.P.						
0 NBOX	INTEGER	ARRAY		VARBL\$	REFS	64	69	133	DEFINED	1
10 NCARAY	INTEGER	ARRAY		VARBL\$	REFS	3				
0 NCNSM <sup>1</sup>	INTEGER	ARRAY		VARBL\$	REFS	3				
3 NDATA	INTEGER	ARRAY		VARBL\$	REFS	3				
2 NDELT	INTEGER	ARRAY		VARBL\$	REFS	3				
643 NFRN	INTEGER	ARRAY		VARBL\$	REFS	3				
0 NMD	INTEGER	*UNUSED	F.P.	FLUTAN	DEFINED	121	94	98	109	113
0 NMFB	INTEGER	*UNUSED	F.P.	VARBL\$	DEFINED	1	68	123		
4 NOPAN	INTEGER	*UNUSED	F.P.	NTPS	REFS	3				
640 NPAN	INTEGER	*UNUSED	F.P.	NTPS	REFS	81	2*130	DEFINED	63	130
0 NRF	INTEGER	*UNUSED	F.P.	NTPS	REFS	1				
57 NRVBO	INTEGER	ARRAY		NTPS	REFS	19				
72 NSARAY	INTEGER	ARRAY		NTPS	REFS	3				
0 NTP1	INTEGER	ARRAY		NTPS	REFS	9				
11 NTP10	INTEGER	ARRAY		NTPS	REFS	9				
1 NTP2	INTEGER	ARRAY		NTPS	REFS	9				
2 NTP3	INTEGER	ARRAY		NTPS	REFS	9				
3 NTP4	INTEGER	ARRAY		NTPS	REFS	9				
4 NTP5	INTEGER	ARRAY		NTPS	REFS	9				
5 NTP6	INTEGER	ARRAY		NTPS	REFS	9				
6 NTP7	INTEGER	ARRAY		NTPS	REFS	9				
7 NTP8	INTEGER	ARRAY		NTPS	REFS	9				
10 NTP9	INTEGER	ARRAY		NTPS	REFS	9				
0 N4	INTEGER	*UNUSED	F.P.	NTPS	REFS	9				
0 N6	INTEGER	*UNUSED	F.P.	MODE	DEFINED	126	1			
0 N8	REAL	ARRAY		VARBL\$	REFS	13	18			
241 P1	REAL	ARRAY		VARBL\$	REFS	3	54	83		
10166 PV	REAL	ARRAY		VARBL\$	REFS	3	77	94		
3426 P1	REAL	ARRAY		VARBL\$	REFS	3				
5706 P2	REAL	ARRAY		VARBL\$	REFS	3				
40 RVBO	REAL	ARRAY		FLUTAN	REFS	15	19			
0 RO	REAL	ARRAY		BODY	REFS	10	51	52		
144 ROP	REAL	ARRAY		BODY	REFS	10	50	79		
623 S	REAL	ARRAY		VARBL\$	REFS	45	DEFINED	31		
11626 SDELX	REAL	ARRAY		COMPLEX	REFS	3	83			
607 SUM	COMPLEX	ARRAY		COMPLEX	REFS	23	120	125	DEFINED	65
611 TRM1	COMPLEX	ARRAY		COMPLEX	REFS	24	54	54	DEFINED	50
613 TRM2	COMPLEX	ARRAY		COMPLEX	REFS</td					

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VARIABLES	SN	TYPE	RELOCATION	REFS	DEFINED	77	95	102	110
650 YO		REAL	ARRAY BODY	REFS REFS	10				
500 ZBO		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
13432 20		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
11006 ZV		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
1766 ZZ		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
4246 ZZ1		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
6526 ZZZ		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
651 ZO		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
2606 Z1		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
5066 Z2		REAL	ARRAY VARBLS	REFS REFS	3	7 8	101	103	
VARIABLES USED AS FILE NAMES, SEE ABOVE									

## EXTERNALS TKER

11

REFERENCES

89

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES	109	101	109	118
ABS	REAL	1	INTRIN	94	49	49	53	
CMPX	COMPLEX	2	INTRIN	46	106	106	2*113	
FLOAT	REAL	1	INTRIN	98				

## STATEMENT LABELS

DEF LINE

REFERENCES

40

530 37 FMT	138	56		
537 40 FMT	139	41		
546 45 FMT	140	58		
551 50 FMT	141	60		
560 64 FMT	142	127		
566 66 FMT	143	132		
575 68 FMT	144	43		
0 187	55	99	107	114
231 365	88	92	101	109
250 366	93	92		
264 367	100	92	94	
302 368	108	92		
320 369	115	92		
325 375	119	75		
342 400	124	70	121	
360 405	129	126		
0 600	131	64		

## LOOPS LABEL INDEX

FROM-TO

LENGTH

PROPERTIES

OPT

EXT REFS

NOT INNER

EXT REFS

## COMMON BLOCKS LENGTH

MEMBERS - BIAS NAME(LENGTH)

O NCNSM1 (1)

3 NDATA (1)

6 IR (1)

58 NSARAY (50)

159 B2 (1)

162 KR (1)

214 X (400)

1414 Z1 (400)

2614 Z2 (400)

3814 EV (400)

5014 SDELX (400)

5864 Y0 (50)

1 NB (1)

4 NOPAN (1)

7 JSPECS (1)

108 NBARAY (50)

160 FL (1)

163 KRDBR (1)

614 Y (400)

1814 P1 (400)

3014 P2 (400)

4214 PV (400)

5414 DELY (400)

5914 Z0 (50)

2 NODELT (1)

5 IO (1)

8 NCARAY (50)

158 ACAP (1)

161 PI (1)

164 GMA (50)

1014 ZZ (400)

2214 ZZ1 (400)

3414 ZZ2 (400)

4614 ZV (400)

5814 XO (50)

5964 GGMA (50)

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COMMON BLOCKS NTPS	LENGTH 10	MEMBERS - BIAS NAME(LENGTH)	
BODY	340	O NTP1 (1) 3 NTP4 (1) 6 NIP7 (1) 9 NIP10 (1) O RQ (100) 220 BGMA (20) 300 VBO (20) O NB (80) O ARQ (120) 1320 DH2 (400) O FMACH (1) 32 RVBO (15) O ITAPES (50) O LC (40)	1 NTP2 (1) 4 NTP5 (1) 7 NTP8 (1) 100 ROP (100) 240 MRK (40) 320 ZBO (20) 80 NARQ (80) 520 H (400) 1 BETA (1) 47 NRVBO (1) 40 CR (1)
MODE	1720		
FLUTAN	48		
CTAPES	50		
COMA	41		

## STATISTICS

PROGRAM LENGTH CM LABELLED COMMON LENGTH 52000B CM USED	3153F 20037B	1643 8223
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SUBROUTINE TKER

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1      SUBROUTINE TKER (XO,YO,ZO,KR,BR,GAMS GAMSIG FMACH,E2,KKR,KKI)    TKER   2
      REAL M, KR KKR, KKI, IODR, IOOI, JODR, JOOI, I10I, I20R3, TKER   3
      1     I20I3, IODR, IOOI, JODR, JOOI, I10I, I20R3, TKER   4
      2     MU1, MU2, K1, K2, K10, K20, K1RT1, K1IT1, K2RT2P, K1OT1, K2OT2P   TKER   5
      5     L = 0
      EPS = 0.00001
      M = FMACH
      R1= SQRT (YO*YO+ZO*ZO)
      R1S = R1
      RTWO = R1*R1
      RTWO = RTWO*RTWO
      RFOUR = RTWO*RTWO
      K10 = 0.0
      K20 = 0.0
      K1RT1 = 0.0
      K1IT1 = 0.0
      K2RT2P = 0.0
      K2IT2P = 0.0
      K1OT1 = 0.0
      K2OT2P = 0.0
      IF ( R1 ) 200, 100, 200
      100 IF ( XO ) 110, 120, 120
      110 KKR=0.
      KKI=0.
      25 GO TO 907
      120 C1= KR*XO/BR
      T1= COS(GAMS-GAMSIG)
      K10 = 2.0
      K1RT1 = 2.0*T1*COS(C1)
      K1IT1 = -2.0*T1*SIN(C1)
      K1OT1 = 2.0*T1
      GO TO 905
      200 C1=COS(GAMS)
      C2=SIN(GAMS)
      C3=COS(GAMSIG)
      C4=SIN(GAMSIG)
      T2P=(ZO*ZO*C1*C3+YO*YO*C2*C4-ZO*YO*(C2*C3+C1*C4))
      T2 = T2P/E2
      IF ( ABS(T2)-EPS ) 210, 220, 220
      210 ICHUZ=1
      T1= COS(GAMS-GAMSIG)
      T2=0.
      GO TO 300
      220 T1= COS(GAMS-GAMSIG)
      IF ( ABS(T1)-EPS ) 230, 240, 240
      230 ICHUZ=2
      T1=0.
      GO TO 300
      240 ICHUZ=3
      300 BETA2 = (1.-M*M)
      BIGR = SQRT (YO*YO+BETA2*R1*R1)
      K1= KR*R1/BR
      MU1= (M*BIGR-YO)/ (BETA2*R1)
      MU=ABS(MU1)
      K2=K1*K1
      IF ( MU1 ) 310, 320, 330
      310
      320
      330
      340
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      360
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      390
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      2110
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SUBROUTINE PRT2

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PAGE 7

VARIABLES SN TYPE

3426 P1 REAL

5706 P2 REAL

40 RVBO REAL

627 SAVE1 REAL

630 SAVE2 REAL

640 SAX2 REAL

624 SDELI REAL

623 SDELRI REAL

11626 SDELX REAL

557 SGR REAL

565 SG5 REAL

617 SL REAL

RELOCATION

ARRAY

ARRAY

FLUTAN

ARRAY

REFS

SUBROUTINE PRT2		74/74 OPT = 1	
VARIABLES	SN	TYPE	RELOCATION
6	IR	INTEGER	VARBL
0	ITAPES	INTEGER	CTAPE
550	ITAPEW	INTEGER	
600	JSPEC	INTEGER	
7	JSPECS	INTEGER	VARBL
242	KR	REAL	VARBL
243	KRDBR	REAL	VARBL
243	K1IT1	REAL	DLM
2	K1RT1	REAL	DLM
0	K10	REAL	DLM
6	K10T1	REAL	DLM
5	K2IT2P	REAL	DLM
4	K2RT2P	REAL	DLM
1	K20	REAL	DLM
7	K2OT2P	REAL	DLM
632	LHS	INTEGER	
574	MULT	INTEGER	
1	NB	INTEGER	VARBL
154	NBARAY	INTEGER	VARBL
0	NBV	INTEGER	F. P.
561	NBXR	INTEGER	
572	NBYX	INTEGER	
10	NCARAY	INTEGER	ARRAY
571	NCM1	INTEGER	VARBL
0	NCNSM1	INTEGER	VARBL
573	NCPNB	INTEGER	VARBL
3	NDATA	INTEGER	VARBL
631	NDBLE	INTEGER	VARBL
2	NDELT	INTEGER	VARBL
554	NDRAG	INTEGER	VARBL
553	NNF	INTEGER	VARBL
4	NOPAN	INTEGER	VARBL
570	NPS	INTEGER	VARBL
57	NRVBO	INTEGER	FLUTA
72	NSARAY	INTEGER	VARBL
0	NTP1	INTEGER	NTPS
11	NTP10	INTEGER	NTPS
1	NTP2	INTEGER	NTPS
2	NTP3	INTEGER	NTPS
3	NTP4	INTEGER	NTPS
4	NTP5	INTEGER	NTPS
5	NTP6	INTEGER	NTPS
6	NTP7	INTEGER	NTPS
7	NTP8	INTEGER	NTPS
10	NTP9	INTEGER	NTPS
0	NYAW	INTEGER	F. P.
241	PI	REAL	VARBL
10166	PV	REAL	VARBL

FTN 4.8+577	I/O REFS	85/01/23	08.10.44	PAGE
142	143	144	145	146
177	199	DEFINED	28	
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67	68	69	2*71	4*74
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144	145	146	156	167
185	186	187	188	193
188	19	22		
I/O REFS	199	200		
122	171	172	DEFINED	60
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6	101	156		
6	100	155		
12	12			
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12	156	DEFINED	99	154
104	110		114	158
52	124		152	179
50	DEFINED		40	56
34	49			
130	156	DEFINED	1	
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56	101	156	DEFINED	49
48	195	DEFINED	48	
28	193		199	200
156	DEFINED		50	201
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156	DEFINED		97	122
24	128		131	
166	DEFINED		27	
156	DEFINED		26	
49	DEFINED		47	
I/O REFS			201	
DEFINED				1
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				61

SUBROUTINE	PRT2	74/74	OPT=1
ENTRY POINTS	DEF LINE	REFERENCES	
3 PRT2	1	211	
VARIABLES	SN TYPE	RELOCATION	VARBLS
236 ACAP	REAL	REFS	6
567 ACGS	REAL	REFS	70
613 AWEIRD	REAL	REFS	73
642 AWW	REAL	REFS	18
1462 AWI	REAL	REFS	101
604 AX	REAL	REFS	101
605 AX1	REAL	REFS	101
606 AX2	REAL	REFS	101
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	101
603 AY2	REAL	REFS	101
607 A2	REAL	REFS	101
610 AZ1	REAL	REFS	141
611 AZ2	REAL	REFS	101
1 BETA	REAL	REFS	13
237 B2	REAL	REFS	164
560 CGS	REAL	REFS	168
566 CGS	REAL	REFS	6
620 CL	REAL	REFS	109
577 CV	REAL	REFS	109
626 DELI	REAL	REFS	101
625 DELR	REAL	REFS	94
12446 DELY	REAL	REFS	93
636 DIJ	REAL	REFS	6
576 DL	REAL	REFS	101
2302 DPRIME	REAL	REFS	103
575 DR	REAL	REFS	182
615 EE	REAL	REFS	76
7346 EV	REAL	REFS	87
10 E2	REAL	REFS	101
551 FDELT	REAL	REFS	101
240 FL	REAL	REFS	110
0 FMACH	REAL	REFS	113
556 GAMS	REAL	REFS	114
564 GAMSIG	REAL	REFS	164
13514 GGMA	REAL	REFS	184
244 GMA	REAL	REFS	185
641 I	INTEGER	REFS	187
562 IG	INTEGER	REFS	20
555 IH	INTEGER	REFS	187
563 IO	INTEGER	REFS	188
5 IQ	INTEGER	REFS	189

VARIABLES	SN TYPE	RELOCATION	VARBLS
236 ACAP	REAL	REFS	6
567 ACGS	REAL	REFS	70
613 AWEIRD	REAL	REFS	73
642 AWW	REAL	REFS	18
1462 AWI	REAL	REFS	200
604 AX	REAL	REFS	201
605 AX1	REAL	REFS	106
606 AX2	REAL	REFS	148
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	147
603 AY2	REAL	REFS	101
607 A2	REAL	REFS	108
610 AZ1	REAL	REFS	101
611 AZ2	REAL	REFS	156
1 BETA	REAL	REFS	101
237 B2	REAL	REFS	101
560 CGS	REAL	REFS	156
566 CGS	REAL	REFS	81
620 CL	REAL	REFS	101
577 CV	REAL	REFS	13
626 DELI	REAL	REFS	74
625 DELR	REAL	REFS	14
12446 DELY	REAL	REFS	109
636 DIJ	REAL	REFS	74
576 DL	REAL	REFS	109
2302 DPRIME	REAL	REFS	113
575 DR	REAL	REFS	113
615 EE	REAL	REFS	104
7346 EV	REAL	REFS	104
10 E2	REAL	REFS	94
551 FDELT	REAL	REFS	183
240 FL	REAL	REFS	6
0 FMACH	REAL	REFS	101
556 GAMS	REAL	REFS	156
564 GAMSIG	REAL	REFS	13
13514 GGMA	REAL	REFS	32
244 GMA	REAL	REFS	33
641 I	INTEGER	REFS	101
562 IG	INTEGER	REFS	190
555 IH	INTEGER	REFS	45
563 IO	INTEGER	REFS	101
5 IQ	INTEGER	REFS	43
236 ACAP	REAL	REFS	43
567 ACGS	REAL	REFS	43
613 AWEIRD	REAL	REFS	42
642 AWW	REAL	REFS	38
1462 AWI	REAL	REFS	30
604 AX	REAL	REFS	31
605 AX1	REAL	REFS	42
606 AX2	REAL	REFS	34
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	156
603 AY2	REAL	REFS	194
607 A2	REAL	REFS	101
610 AZ1	REAL	REFS	61
611 AZ2	REAL	REFS	35
1 BETA	REAL	REFS	66
237 B2	REAL	REFS	67
560 CGS	REAL	REFS	69
566 CGS	REAL	REFS	112
620 CL	REAL	REFS	113
577 CV	REAL	REFS	113
626 DELI	REAL	REFS	113
625 DELR	REAL	REFS	113
12446 DELY	REAL	REFS	113
636 DIJ	REAL	REFS	113
576 DL	REAL	REFS	113
2302 DPRIME	REAL	REFS	113
575 DR	REAL	REFS	113
615 EE	REAL	REFS	113
7346 EV	REAL	REFS	113
10 E2	REAL	REFS	113
551 FDELT	REAL	REFS	183
240 FL	REAL	REFS	6
0 FMACH	REAL	REFS	101
556 GAMS	REAL	REFS	156
564 GAMSIG	REAL	REFS	13
13514 GGMA	REAL	REFS	32
244 GMA	REAL	REFS	33
641 I	INTEGER	REFS	101
562 IG	INTEGER	REFS	190
555 IH	INTEGER	REFS	45
563 IO	INTEGER	REFS	101
5 IQ	INTEGER	REFS	43
236 ACAP	REAL	REFS	43
567 ACGS	REAL	REFS	43
613 AWEIRD	REAL	REFS	42
642 AWW	REAL	REFS	38
1462 AWI	REAL	REFS	30
604 AX	REAL	REFS	31
605 AX1	REAL	REFS	42
606 AX2	REAL	REFS	34
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	156
603 AY2	REAL	REFS	194
607 A2	REAL	REFS	101
610 AZ1	REAL	REFS	61
611 AZ2	REAL	REFS	35
1 BETA	REAL	REFS	66
237 B2	REAL	REFS	67
560 CGS	REAL	REFS	69
566 CGS	REAL	REFS	112
620 CL	REAL	REFS	113
577 CV	REAL	REFS	113
626 DELI	REAL	REFS	113
625 DELR	REAL	REFS	113
12446 DELY	REAL	REFS	113
636 DIJ	REAL	REFS	113
576 DL	REAL	REFS	113
2302 DPRIME	REAL	REFS	113
575 DR	REAL	REFS	113
615 EE	REAL	REFS	113
7346 EV	REAL	REFS	113
10 E2	REAL	REFS	113
551 FDELT	REAL	REFS	183
240 FL	REAL	REFS	6
0 FMACH	REAL	REFS	101
556 GAMS	REAL	REFS	156
564 GAMSIG	REAL	REFS	13
13514 GGMA	REAL	REFS	32
244 GMA	REAL	REFS	33
641 I	INTEGER	REFS	101
562 IG	INTEGER	REFS	190
555 IH	INTEGER	REFS	45
563 IO	INTEGER	REFS	101
5 IQ	INTEGER	REFS	43
236 ACAP	REAL	REFS	43
567 ACGS	REAL	REFS	43
613 AWEIRD	REAL	REFS	42
642 AWW	REAL	REFS	38
1462 AWI	REAL	REFS	30
604 AX	REAL	REFS	31
605 AX1	REAL	REFS	42
606 AX2	REAL	REFS	34
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	156
603 AY2	REAL	REFS	194
607 A2	REAL	REFS	101
610 AZ1	REAL	REFS	61
611 AZ2	REAL	REFS	35
1 BETA	REAL	REFS	66
237 B2	REAL	REFS	67
560 CGS	REAL	REFS	69
566 CGS	REAL	REFS	112
620 CL	REAL	REFS	113
577 CV	REAL	REFS	113
626 DELI	REAL	REFS	113
625 DELR	REAL	REFS	113
12446 DELY	REAL	REFS	113
636 DIJ	REAL	REFS	113
576 DL	REAL	REFS	113
2302 DPRIME	REAL	REFS	113
575 DR	REAL	REFS	113
615 EE	REAL	REFS	113
7346 EV	REAL	REFS	113
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240 FL	REAL	REFS	6
0 FMACH	REAL	REFS	101
556 GAMS	REAL	REFS	156
564 GAMSIG	REAL	REFS	13
13514 GGMA	REAL	REFS	32
244 GMA	REAL	REFS	33
641 I	INTEGER	REFS	101
562 IG	INTEGER	REFS	190
555 IH	INTEGER	REFS	45
563 IO	INTEGER	REFS	101
5 IQ	INTEGER	REFS	43
236 ACAP	REAL	REFS	43
567 ACGS	REAL	REFS	43
613 AWEIRD	REAL	REFS	42
642 AWW	REAL	REFS	38
1462 AWI	REAL	REFS	30
604 AX	REAL	REFS	31
605 AX1	REAL	REFS	42
606 AX2	REAL	REFS	34
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	156
603 AY2	REAL	REFS	194
607 A2	REAL	REFS	101
610 AZ1	REAL	REFS	61
611 AZ2	REAL	REFS	35
1 BETA	REAL	REFS	66
237 B2	REAL	REFS	67
560 CGS	REAL	REFS	69
566 CGS	REAL	REFS	112
620 CL	REAL	REFS	113
577 CV	REAL	REFS	113
626 DELI	REAL	REFS	113
625 DELR	REAL	REFS	113
12446 DELY	REAL	REFS	113
636 DIJ	REAL	REFS	113
576 DL	REAL	REFS	113
2302 DPRIME	REAL	REFS	113
575 DR	REAL	REFS	113
615 EE	REAL	REFS	113
7346 EV	REAL	REFS	113
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240 FL	REAL	REFS	6
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556 GAMS	REAL	REFS	156
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606 AX2	REAL	REFS	34
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	156
603 AY2	REAL	REFS	194
607 A2	REAL	REFS	101
610 AZ1	REAL	REFS	61
611 AZ2	REAL	REFS	35
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237 B2	REAL	REFS	67
560 CGS	REAL	REFS	69
566 CGS	REAL	REFS	112
620 CL	REAL	REFS	113
577 CV	REAL	REFS	113
626 DELI	REAL	REFS	113
625 DELR	REAL	REFS	113
12446 DELY	REAL	REFS	113
636 DIJ	REAL	REFS	113
576 DL	REAL	REFS	113
2302 DPRIME	REAL	REFS	113
575 DR	REAL	REFS	113
615 EE	REAL	REFS	113
7346 EV	REAL	REFS	113
10 E2	REAL	REFS	113
551 FDELT	REAL	REFS	183
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556 GAMS	REAL	REFS	156
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1462 AWI	REAL	REFS	30
604 AX	REAL	REFS	31
605 AX1	REAL	REFS	42
606 AX2	REAL	REFS	34
601 AY	REAL	REFS	101
602 AY1	REAL	REFS	156
603 AY2	REAL	REFS	194
607 A2	REAL	REFS	101
610 AZ1	REAL	REFS	61
611 AZ2	REAL	REFS	35
1 BETA	REAL	REFS	66
237 B2	REAL		

```

NDBLE = JSPEC
GMSIG = GMA(1G)
SGS = SIN(GMSIG)
AZ = ZZ(IQ) + ZV(IR)
AZ1 = ZZ(IQ) + ZZ2(IR)
AZ2 = ZZ(IQ) + ZZ1(IR)
JSPEC = 0
MULT = JSPECS
GO TO 310
350 CONTINUE
DELR = SDELR + SSDELR*FDELT
DELI = SDELI + SSDELI*FDELT
DIJ = SAVE1 + SAVE2 *FDELT
AWW(IR) = DIJ - DELR
AWI(IR)=-DELI
DPRIME(IR) = DR + DL*FDELT
IR = IR + 1
GMSIG = GMA(1G)
GAMS = GMA(1H)
SGS = SIN(GMSIG)
SGR = SIN(GAMS)
IF(IR.GT.NCNSM1) GO TO 360
10 = 10 + 1
IF (10.GT.NCM1) 10 = 1
GO TO 120
360 CONTINUE
IF (INDATA.EQ.0) GO TO 380
WRITE (ITAPEW,10) IQ,NCNSM1
WRITE (ITAPEW,30) (AWW(I),AWI(I), I=1,NCNSM1)
380 WRITE (NTP1) (AWW(I),AWI(I), I=1,NCNSM1)
390 CONTINUE
C
C FORMATS
C
10 FORMAT (1HO,15HWW PART OF ROW,15,2X, 4HWITH,15,2X,27HELEMENTS IS
1NOW PRINTED OUT)
30 FORMAT (1HO,6E20.8)
C
RETURN
END
205
206
207
208
209
210
211
212
213

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CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM  
28 I CONTROL VARIABLE IN COMMON OR EQUIVALENCED. OPTIMIZATION MAY BE INHIBITED.

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115      250 CONTINUE
          IF (JSPEC.EQ.0) GO TO 270
          GAMSIG = -GAMSIG
          SGS = -SGS
          AZ = ZZ(IQ) + ZV(IR)
          AZ1 = ZZ(IQ) + ZZ1(IR)
          AZ2 = ZZ(IQ) + ZZ2(IR)
          NDDBL = JSPEC
          JSPEC = O
          MULT = JSPECS
          GO TO 230
270 CONTINUE
          NDDBL = O
          IF (NDELT.EQ.0) GO TO 350
          IF (NYAW.EQ.0) GO TO 280
          IF (IO.GT.NBV) GO TO 280
          IF (NDELT.EQ.1) GO TO 350
          SSDELR = -SDELRI
          SDEL1 = -SDEL1
          SAVE2 = -SAVE1
          DL = -DR
          GO TO 350
280 CONTINUE
          JSPEC = JSPECS
          SL = -SL
          TL = -TL
          AZ = ZZ(IQ) - ZV(IR)
          AZ1 = ZZ(IQ) - ZZ2(IR)
          AZ2 = ZZ(IQ) - ZZ1(IR)
          AY = Y(IQ) + PV(IR)
          AY1 = Y(IQ) + P2(IR)
          AY2 = Y(IQ) + P1(IR)
          SAX2 = AX2
          AX2 = AX1
          AX1 = SAX2
150      GAMSIG = -GMA(IG)
          SGS = SIN(GAMSIG)
          MULT = 1
310 CONTINUE
          LHS = 1
          IF (KRDNR.LE.SMALL) GO TO 320
          CALL INCRD(AX,AY,AZ,AX1,AY1,AZ1,AX2,AY2,AZ2,GAMS,GAMSIG,LHS,
        *1IR,NFF,I0,NBXS,NCPNB,NDBLE,NBV,DELRI,FL,BETA,SDELX,DELY,KR)
          SSDELR = SSDELR + DELR*(FLOAT(MULT))
          SSDELI = SSDELI + DELI*(FLOAT(MULT))
320 CONTINUE
          XO = AX
          YO = AY
          ZO = AZ
          CALL SNPDF(SL,CL,TL,SGS,CGR,SGR,CGR,XO,YO,ZO,EE,DIJ,BETA,CV)
          SAVE2 = SAVE2 + DIJ *(FLOAT(MULT))
          IF (NDRAF.EQ.0) GO TO 330
          XPRIME = EV(IQ) - EV(IR)
          CALL SNPDF(SL,CL,TL,SGS,CGR,SGR,XO,YO,ZO,EE,DIJ,BETA,CV)
          DL = DL + DIJ *(FLOAT(MULT))
330 CONTINUE
          IF (.NOT.PFC.FN.O) GO TO 350
          PRT2 116
          PRT2 117
          PRT2 118
          PRT2 119
          PRT2 120
          PRT2 121
          PRT2 122
          PRT2 123
          PRT2 124
          PRT2 125
          PRT2 126
          PRT2 127
          PRT2 128
          PRT2 129
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          PRT2 165
          PRT2 166
          PRT2 167
          PRT2 168
          PRT2 169
          PRT2 170
          PRT2 171
          PRT2 172

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SUBROUTINE PRT2      74/74    OPT=1          FTN 4.8+577          85/01/23. 08.10.44          PAGE   2

130 CONTINUE
  CV = SDELX(IR)
  JSPEC = JSPECS
  AY = Y(IQ) - PV(IR)
  AY1 = Y(IQ) - P1(IR)
  AY2 = Y(IQ) - P2(IR)
  AX = X(IQ) - EV(IR)
  AX1 = X(IQ) - Z1(IR)
  AX2 = X(IQ) - Z2(IR)
  AZ = ZZ(IQ) - ZV(IR)
  A21 = ZZ(IQ) - ZZ1(IR)
  A22 = ZZ(IQ) - ZZ2(IR)
  IF (ACGS.LE.SMALL) GO TO 190
  WEIRD = ZZ(IR) - Z1(IR)
  AWEIRD = ABS(WEIRD)
  IF (AWEIRD.LT.SMALL) GO TO 200
  TL = (((Z2(IR)-Z1(IR))/(P2(IR)-P1(IR)))*CGS)/BETA
  180 CONTINUE
  EE = DELY(IR)/2.
  SQTL = SORT(1. + TL**2)
  SL = TL/SQTL
  CL = 1./SQTL
  GO TO 210
  190 TL = ((Z2(IR) - Z1(IR))/(Z22(IR) - ZZ1(IR)))/BETA
  GO TO 180
  200 TL = 0.
  SQTL = 1.
  CL = 1.
  SL = 0.
  EE = (DELY(IR))/2.
  210 CONTINUE
  SSDELR = 0.
  SSDELI = 0.
  SDELR = 0.0
  SDELI = 0.0
  DELR = 0.0
  DELI = 0.0
  SAVE1 = 0.
  SAVE2 = 0.
  NOBLE = 0
  230 CONTINUE
  LHS = 0
  IF (KRDBR.LE.SMALL) GO TO 240
  CALL INCRO(AX,AY,AZ,AX1,AY1,AZ1,AX2,AY2,AZ2,GAMS,GAMSIG,LHS,
  1IR,NFF,IO,NBXS,NCPNB,NOBLE,NEV,DELR,DELI,FL,BETA,SDELX,DELY,KR)
  SDELR = SDELR + DELR*(FLOAT(MULT))
  SDELI = SDELI + DELI*(FLOAT(MULT))
  240 CONTINUE
  XO = AX
  YO = AY
  ZO = AZ
  CALL SNPDF(SL,CL,TL,SGS,CGS,SGR,CGR,XO,YO,ZO,EE,DIJ,BETA,CV)
  SAVE1 = SAVE1 + DIJ*(FLOAT(MULT))
  IF (NDRAG.EQ.0) GO TO 250
  XPRIME = EV(IQ) - EV(IR)
  CALL SNPDF(SL,CL,TL,SGS,CGS,SGR,CGR,XO,YO,ZO,EE,DIJ,BETA,CV)
  DR = DR + DIJ*(FLOAT(MULT))

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  PRT2      59
  PRT2      60
  PRT2      61
  PRT2      62
  PRT2      63
  PRT2      64
  PRT2      65
  PRT2      66
  PRT2      67
  PRT2      68
  PRT2      69
  PRT2      70
  PRT2      71
  PRT2      72
  PRT2      73
  PRT2      74
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  PRT2     101
  PRT2     102
  PRT2     103
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  PRT2     105
  PRT2     106
  PRT2     107
  PRT2     108
  PRT2     109
  PRT2     110
  PRT2     111
  PRT2     112
  PRT2     113
  PRT2     114
  PRT2     115

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PAGE 1
PRT2 85/01/23 08:10:44
SUBROUTINE PRT2 74/74 QPT=1

      C   SUBROUTINE PRT2 (NYAW,NBV)
      C   REAL   K10,K20,K1RT1,K1IT1,K2IT2P,K1OT1,K2OT2P
      C   REAL   KR,KRDBR
      C   COMMON /VARBLS / NCNSM1,NB,NDELT,NDATA,NOPAN,IQ,IR,JSPECs,
      C   NCARAY(50),NSARAY(50),NBARRAY(50),ACAP,B2,FL,PI,
      C   KR,KRDBR,GMA(50),X(400),Y(400),Z2(400),Z1(400),
      C   P1(400),Z21(400),Z2(400),P2(400),Z22(400),
      C   EV(400),PV(400),ZV(400),SDELX(400),DELY(400),
      C   X0(50),Y0(50),Z0(50),GGMA(50)
      C   COMMON /DLIM/ K10,K20,K1RT1,K1IT1,K2IT2P,K1OT1,K2OT2P,E2
      C   COMMON /FLUTAN/ FMACH,BETA,VBO,RVBO,NRVBO
      C   COMMON /NTPS/ NTP1,NTP2,NTP3,NTP4,NTP5,NTP6,NTP7,NTP8,NTP9,NTP10
      C   COMMON /CTAPES / ITAPES / ITAPES
      C   DIMENSION VBO(30), RVBO(15)
      C   DIMENSION AW(400), AWWI(400)
      C   DIMENSION ITAPES(50)
      C   DIMENSION DPRIME(400)
      C   ITAPEW = ITAPES(6)
      C   FDELT = NDELT
      C   SMALL = 0.000001
      C   NFF = 0
      C   NDRAg = 0
      C   DO 390 IQ = 1,NCNSM1
      C   IH = 0
      C   390 IH = IH + 1
      C   GAMS = GMA(IH)
      C   SGR = SIN(GAMS)
      C   CGR = COS(GAMS)
      C   NBXR=NBARAY(IH)
      C   IF (IQ.LE.NBXR) GO TO 100
      C   GO TO 90
      C   100 CONTINUE
      C   IG = 0
      C   IR = 1
      C   NB = 0
      C   IO = 1
      C   110 IG = IG + 1
      C   GAMSIG= GMA(IG)
      C   SGS = SIN(GAMSIG)
      C   CGS = COS(GAMSIG)
      C   ACGS = ABS(CGS)
      C   NPS = IG
      C   NCM1 = NCARAY(NPS) - 1
      C   NBXS = NBARRAY(NPS)
      C   NCPNB = NCM1 + NB
      C   120 CONTINUE
      C   MUL T = 1
      C   DR = 0.
      C   DL = 0.
      C   IF (IR.LE.NBXS) GO TO 130
      C   NB = NBXS
      C   GN TN 110
      C   PRT2 2
      C   PRT2 3
      C   PRT2 4
      C   PRT2 5
      C   PRT2 6
      C   PRT2 7
      C   PRT2 8
      C   PRT2 9
      C   PRT2 10
      C   PRT2 11
      C   PRT2 12
      C   PRT2 13
      C   PRT2 14
      C   PRT2 15
      C   PRT2 16
      C   PRT2 17
      C   PRT2 18
      C   PRT2 19
      C   PRT2 20
      C   PRT2 21
      C   PRT2 22
      C   PRT2 23
      C   PRT2 24
      C   PRT2 25
      C   PRT2 26
      C   PRT2 27
      C   PRT2 28
      C   PRT2 29
      C   PRT2 30
      C   PRT2 31
      C   PRT2 32
      C   PRT2 33
      C   PRT2 34
      C   PRT2 35
      C   PRT2 36
      C   PRT2 37
      C   PRT2 38
      C   PRT2 39
      C   PRT2 40
      C   PRT2 41
      C   PRT2 42
      C   PRT2 43
      C   PRT2 44
      C   PRT2 45
      C   PRT2 46
      C   PRT2 47
      C   PRT2 48
      C   PRT2 49
      C   PRT2 50
      C   PRT2 51
      C   PRT2 52
      C   PRT2 53
      C   PRT2 54
      C   PRT2 55
      C   PRT2 56
      C   PRT2 57
      C   PRT2 58
      C   PRT2

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SUBROUTINE TKER 74/74 OPT=1

FTN 4.8+577

85/01/23 . 08.10.44

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## STATEMENT LABELS

DEF LINE REFERENCES

0 100	INACTIVE	22	21
0 110	INACTIVE	23	22
27 120		26	2*22
46 200		33	2*21
0 210	INACTIVE	40	39
100 220		44	2*39
0 230	INACTIVE	46	45
111 240		49	2*45
112 300		50	48
0 310	INACTIVE	57	56
133 320		59	56
135 330		78	56
264 340		109	104
302 350		111	6*109
345 360		125	4*123
420 370		133	2*131
451 380		138	109
453 390		139	109
473 410		143	2*123
663 420		162	109
754 430		176	4*175
1002 440		179	2*175
1036 450		184	2*183
1042 460		186	178
1045 500		188	137
1111 510		202	2*201
1116 520		205	201
1123 530		208	4*201
1156 540		214	2*201
1205 900		221	3*213
1216 905		228	32
1235 907		237	25

STATISTICS  
PROGRAM LENGTH 1460B  
52000B CM USED

SUBROUTINE TKER				74/74	OPT=1	RELOCATION	
VARIABLES	SN	TYPE					
1434 Q1		REAL					
1445 Q10		REAL					
1446 Q11		REAL					
1435 Q2		REAL					
1436 Q3		REAL					
1437 Q4		REAL					
1440 Q5		REAL					
1441 Q6		REAL					
1442 Q7		REAL					
1443 Q8		REAL					
1444 Q9		REAL					
1377 RFOUR		REAL					
1376 RTWO		REAL					
1374 R1		REAL					
1375 R15		REAL					
1432 R10		REAL					
1433 R11		REAL					
1422 R2		REAL					
1423 R3		REAL					
1424 R4		REAL					
1425 R5		REAL					
1426 R6		REAL					
1427 R7		REAL					
1430 R8		REAL					
1431 R9		REAL					
1401 T1		REAL					
1406 T2		REAL					
1405 T2P O	XO	REAL					
O YO		REAL					
O ZO		REAL					
EXTERNALS		TYPE	ARGS	REFERENCES			
COS		REAL	1 LIBRARY	27	29	33	35
EXP		REAL	1 LIBRARY	78		41	44
SIN		REAL	1 LIBRARY	30	34	36	170
SQRT		REAL	1 LIBRARY	9	51	172	195
						197	200
INLINE FUNCTIONS		TYPE	ARGS	DEF LINE	REFERENCES		
ABS		REAL	1 INTRIN	39	45	54	54
FLOAT		REAL	1 INTRIN	235			

ROUTINE	NAME	TYPE	RELOCATION	FTN 4.8+577	85/01/23. 08.10.44	PAGE
VARIABLES	SN	REAL				6
1450	DK1R	REAL	REFS	222	DEFINED	211
1453	DK2I	REAL	REFS	225	DEFINED	220
1452	DK2R	REAL	REFS	224	DEFINED	219
1412	E	REAL	REFS	11*143	11*155	11*166
1373	EPS	REAL	REFS	39	DEFINED	7
O	E2	REAL	REFS	38	DEFINED	1
O	FMACH	REAL	REFS	8	DEFINED	1
O	GAMS	REAL	REFS	27	33	34
O	GAMSIG	REAL	REFS	1	41	44
1407	ICHUZ	INTEGER	REFS	27	35	36
1347	I0U1	REAL	REFS	1	41	44
1346	I0UR	REAL	REFS	141	175	59
1337	I00I	REAL	REFS	213	DEFINED	40
1336	I00R	REAL	REFS	166	176	46
1353	I1U1	REAL	REFS	2	129	139
1352	I1UR	REAL	REFS	162	138	138
1343	I10I	REAL	REFS	2	135	138
1342	I10R	REAL	REFS	2	209	208
1355	I2U13	REAL	REFS	2	186	203
1354	I2UR3	REAL	REFS	2	186	202
1345	I20I3	REAL	REFS	2	203	186
1344	I20R3	REAL	REFS	2	186	202
1351	J0U1	REAL	REFS	2	217	181
1350	J0UR	REAL	REFS	2	184	216
1341	J00I	REAL	REFS	2	206	179
1340	JOOR	REAL	REFS	2	184	205
O	KKI	REAL	REFS	2	205	187
O	KKR	REAL	REFS	2	179	181
O	KKR	REAL	REFS	2	181	184
O	KR	REAL	REFS	2	216	202
1356	K1	REAL	REFS	2	179	184
1365	K1IT1	REAL	REFS	2	181	205
1364	K1RT1	REAL	REFS	2	181	205
1362	K1O	REAL	REFS	2	181	205
1370	K1OT1	REAL	REFS	2	181	205
1361	K2	REAL	REFS	230	236	236
1367	K2IT2P	REAL	REFS	5	229	235
1366	K2RT2P	REAL	REFS	5	226	235
1363	K2O	REAL	REFS	5	226	235
1371	K2OT2P	REAL	REFS	5	227	235
L	INTEGER		REFS	5	234	235
1335	M	REAL	REFS	2	2*50	6
1360	MU	REAL	REFS	2	78	11*143
1357	MU1	REAL	REFS	2	54	56

SUBROUTINE TKER      74/74      OPT=1

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230      K1RT1 = K1IT1 /RTWO
         K1IT1 = K1IT1 /RTWO
         K1OT1 = K1OT1 /RTWO
         K2RT2P = K2RT2P/RFOUR
         K2IT2P = K2IT2P/RFOUR
         K2OT2P = K2OT2P/RFOUR
         KKR = K1RT1+K2RT2P - (K1OT1+K2OT2P)*FLOAT(L)
         KKI = K1IT1 + K2IT2P
         907 CONTINUE
         RETURN
         END

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#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS      DEF LINE

3      TKER

1

REFERENCES

238

VARIABLES	SN	TYPE	RELOCATION	REFS	51	53	214	218	DEFINED	50
1410    BETA2		REAL		REFS DEFINED	53	196	210	214	2*218	
1411    BIGR		REAL		REFS DEFINED	51	198				1
O      BR		REAL	F.P.	REFS DEFINED	26	52				
1447    CAR		REAL		REFS DEFINED	187	186				
1455    CK1I		REAL		REFS DEFINED	211	212	212	209		
1454    CK1R		REAL		REFS DEFINED	211	212	212	208		
1457    CK2I		REAL		REFS DEFINED	219	220	220	217		
1456    CK2R		REAL		REFS DEFINED	219	220	220	216		
1400    C1		REAL		REFS DEFINED	29	30	2*37	92	111	143
176				REFS DEFINED	177	179	181	208	216	217
1420    C10		REAL		REFS DEFINED	26	33	80	170	194	155
1421    C11		REAL		REFS DEFINED	104	120	143	155	DEFINED	89
1402    C2		REAL		REFS DEFINED	102	121	143	155	DEFINED	90
179				REFS DEFINED	2*37	93	112	143	155	176
171				REFS DEFINED	181	209	216	217	DEFINED	34
1403    C3		REAL		REFS DEFINED	2*37	94	113	143	155	173
195				REFS DEFINED	195	208	209	2*214	2*215	194
172				REFS DEFINED	172	193	196			82
1404    C4		REAL		REFS DEFINED	177	2*37	95	114	143	174
1413    C5		REAL		REFS DEFINED	2*179	2*181	208	209	3*214	215
1414    C6		REAL		REFS DEFINED	36	83	173	197		176
1415    C7		REAL		REFS DEFINED	96	115	143	155	179	181
1416    C8		REAL		REFS DEFINED	200	84	174	198		199
1417    C9		REAL		REFS DEFINED	97	116	143	155	170	171
				REFS DEFINED	181	211	212	219	220	179
				REFS DEFINED	199					169
				REFS DEFINED	98	117	143	155		215
				REFS DEFINED	220	86	200			219
				REFS DEFINED	99	118	143	155		212
				REFS DEFINED	87	214				217
				REFS DEFINED	100	119	143	155		217
				REFS DEFINED	88	215				217

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OPT = 1
74 / 74
SUBROUTINE TKER
C3= SQRT( 1.+MU*MU)
C4= MU/C3
C5= C4/(1.+MU*MU)
GO TO (430,440,430
430 I1UI = C2*(1.-C4+K1
I1UI = -C2*K1*I1UR-C
GO TO (500,440,440
440 I2UR3 = C2*(2.*(1.-K2*JOU1)
I2UI3 = C2*(C6*(1.-K2*JOUR)
GO TO (500,500,500
450 I2UR3 = 2.0 * 120R3
IF ( ICHUZ-6 )
460 I1UR = 2.*I1UR-I1UR
I1UR = CAR
500 DK1R=0,
R1 = R1S
DK1I=0,
DK2R=0,
DK2I=0,
C3=K1+MU1
C1=COS(C3)
C2=SIN(C3)
C3= M*R/BIGR
C4=SQRT(1.+MU1*MU1)
C5=KR*/O/BR
C6=COS(C5)
C7=SIN(C5)
GO TO (530,540,530,
510 I1UR=I1OR
I1UI=I1OI
IF ( ICHUZ-7 )
520 I2UR3= I20R3
I2UI3= I20I3
IF ( ICHUZ-8 )
530 CK1R = I1UR + C3*C1
CK1I = I1UI - C3*C2
K1O = 1.0 + X0/BIG
DK1R = CK1R*C6 + CK
DK1I = CK1I*C6 - CK
GO TO (900,540,540
540 C8= (BETA2*(R1/BIG
C9= ( K1*C3)*( C3/C
CK2R = -I2UR3 + C8*
CK2I = -I2UI3 - C9*
K2O = -2.0 -X0*( 2.
DK2R = CK2R*UG + CK
DK2I = CK2I*C6 - CK
900 CONTINUE
K1RT1 = T1 * DK1R
K1IT1 = T1 * DK1I
K2RT2P = T2P* DK2R
K2IT2P = T2P* DK2I
K1OT1 = K1O* T1
K2OT2P = K2O* T2P

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FTN 4.8+577	<p>85/01/23 . 08 . 10 . 44</p> <p>PAGE</p> <p>TKER 173      TKER 174      TKER 175      TKER 176      TKER 177      TKER 178      TKER 179      TKER 180      TKER 181      TKER 182      TKER 183      TKER 184      TKER 185      TKER 186      TKER 187      TKER 188      TKER 189      TKER 190      TKER 191      TKER 192      TKER 193      TKER 194      TKER 195      TKER 196      TKER 197      TKER 198      TKER 199      TKER 200      TKER 201      TKER 202      TKER 203      TKER 204      TKER 205      TKER 206      TKER 207      TKER 208      TKER 209      TKER 210      TKER 211      TKER 212      TKER 213      TKER 214      TKER 215      TKER 216      TKER 217      TKER 218      TKER 219      TKER 220      TKER 221      TKER 222      TKER 223      TKER 224      TKER 225      TKER 226      TKER 227      TKER 228      TKER 229</p> <p>ICHUZ ***(C6*(1.-C1)-K1*IOUR      ...*(1.-C4)-C5*K1*IOU1      ICHUZ</p> <p>ICHUZ ))*(-C3/C4)</p>
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115      Q5 = R5/ C5          TKER 116
        Q6 = R6/ C6          TKER 117
        Q7 = R7/ C7          TKER 118
        Q8 = R8/ C8          TKER 119
        Q9 = R9/ C9          TKER 120
120      Q10 = R10/C10       TKER 121
        Q11 = R11/C11       TKER 122
122      GO TO (420,410,410,390,360,360,380,360,360), ICHUZ    TKER 123
123      TKER 124
124      TKER 125
125      360 JOOR = Q1*( .138384-K2)+Q2*( .553536-K2)+Q3*( .1.245456-K2)+Q4*(
1           (2.214144-K2)+Q5*( .3.4596-K2)+Q6*( .4.981824-K2)+Q7*( .6.780816
2           -K2)-Q8*( .8.856576-K2)+Q9*( .11.209104-K2)+Q10*( .13.8384-K2)+TKER 127
3           Q11*( .16.744464-K2)           TKER 128
120R3= 2.+K1*K1001+K2*J00R           TKER 129
129      TKER 130
130      GO TO (420,410,410,390,410,390,380,370,370), ICHUZ    TKER 131
131      TKER 132
132      TKER 133
133      TKER 134
134      370 JOOI = -K1*(- .744*Q1+1.488*Q2+2.232*Q3+2.976*Q4+3.72*Q5+4.464*Q6+
1           5.208*Q7+5.952*Q8+6.696*Q9+7.44*Q10+8.184*Q11)           TKER 135
135      I20I3= -K1*I00R+K2*J00I           TKER 136
136      TKER 137
137      IF ( ICHUZ .EQ. 8 )           GO TO 500           TKER 138
380 I10I = -K1*I00R           TKER 139
390 I10R = 1.+K1*I00I           TKER 140
140      GO TO (420,410,410,420,410,410,500,500,500), ICHUZ    TKER 141
141      TKER 142
142      TKER 143
143      410 JOUR = E*(Q1*(- .138384-K2+.372*MU*C1)+TKER 144
1           E*(Q2*( .553536-K2+.744*MU*C2)+TKER 145
2           E*(Q3*( .1.245456-K2+.1.116*MU*C3)+TKER 146
3           E*(Q4*( .2.214144-K2+.1.488*MU*C4)+TKER 147
4           E*(Q5*( .3.4596-K2+.1.86*MU*C5)+TKER 148
5           E*(Q6*( .4.981824-K2+.2.322*MU*C6)+TKER 149
6           E*(Q7*( .6.780816-K2+.2.604*MU*C7)+TKER 150
7           E*(Q8*( .8.856576-K2+.2.976*MU*C8)+TKER 151
8           E*(Q9*( .11.209104-K2+.3.348*MU*C9)+TKER 152
9           E*(Q10*( .13.8384-K2+.3.72*MU*C10)+TKER 153
A           E*(Q11*( .16.744464-K2+.4.092*MU*C11)))))))           TKER 154
154      TKER 155
155      JOUI = -K1*(E*(Q1*(- .744*MU*C1)+E*(Q2*( .1.488+MU*C2)+TKER 156
1           E*(Q3*( .2.232+MU*C3)+E*(Q4*( .2.976+MU*C4)+TKER 157
2           E*(Q5*( .3.72+MU*C5)+E*(Q6*( .4.464+MU*C6)+TKER 158
3           E*(Q7*( .5.208+MU*C7)+E*(Q8*( .5.952+MU*C8)+TKER 159
4           E*(Q9*( .6.696+MU*C9)+E*(Q10*( .7.44+MU*C10)+TKER 160
5           E*(Q11*( .8.184+MU*C11)))))))           TKER 161
161      TKER 162
162      TKER 163
163      420 IOUR = .372*E*(R1+E*(2.*R2+E*(3.*R3+E*(4.*R4+E*(5.*R5+E*(6.*R6+
1           E*(7.*R7+E*(8.*R8+E*(9.*R9+E*(10.*R10+E*11.*R11)))))))           TKER 164
2           ))))           TKER 165
165      TKER 166
166      IOUI = -K1*(E*(R1+E*(R2+E*(R3+E*(R4+E*(R5+E*(R6+E*(R8+E*(R9
1           +E*(R10+E*R11))))))))           TKER 167
2           ))))           TKER 168
168      R1 = R15           TKER 169
C6= K1*MU           TKER 170
C1= SIN(C6)           TKER 171
C2= COS(C6)           TKER 172

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2 PAGE
SUBROUTINE TKER    74/74   OPT=1          FTN 4.8+577          85/01/23 . 08 . 10 . 44
GO TO 330
320 ICHUZ=ICHUZ+6
C (N*C)*2 FOR N=1,11 AND C=.372 =
C   C   138384      553536      1.245456      2.214144
C   C   3.4596       4.981824     6.780816      8.856576
C   C   11.209104    13.8384     16.744464
C   C   (N*C) FOR N=1,12 AND 14,16,18,20,22 =
C   C   744        1.116      1.488      1.86      2.232
C   C   2.604       2.976      3.348      3.72      4.092
C   C   4.464       5.208      5.952      6.696      7.44
C   C   8.184
C   C   A(N) FORN(=1,11) =
C   C   .24186198      -2.7918027      24.991079      -111.59196
C   C   271.43549      -305.75288      -41.18363      545.98537
C   C   -644.78155      328.72755      -64.279511
C   C   330 E= EXP ( -.372*MU )
C1 = 138384+K2
C2 = 553536+K2
C3 = 1.245456+K2
C4 = 2.214144+K2
C5 = 3.4596+K2
C6 = 4.981824+K2
C7 = 6.780816+K2
C8 = 8.856576+K2
C9 = 11.209104+K2
C10 = 13.8384+K2
C11 = 16.744464+K2
R1 = -24186198 / C1
R2 = -2.7918027 / C2
R3 = 24.991079 / C3
R4 = -111.59196 / C4
R5 = 271.43549 / C5
R6 = -305.75288 / C6
R7 = -41.18363 / C7
R8 = 545.98537 / C8
R9 = -644.78155 / C9
R10 = 328.72755 / C10
R11 = -64.279511 / C11
IF ( ICHUZ.LT. 4 ) GO TO 340
1005 IOOR = .372*(R1 +2.*R2 + 3.*R3 + 4.*R4 + 5.*R5 + 6.*R6 + 7.*R7 +
1     8.*R8 + 9.*R9 + 10.*R10 + 11.*R11)
1001 = -K1*(R1+R2+R3+R4+R5+R6+R7+R8+R9+R10+R11)
340 GO TO (420,350,390,350,350,380,350,350),ICHUZ
1110 350 O1 = R1/ C1
Q2 = R2/ C2
Q3 = R3/ C3
Q4 = R4/ C4
TKER 59
TKER 60
TKER 61
TKER 62
TKER 63
TKER 64
TKER 65
TKER 66
TKER 67
TKER 68
TKER 69
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TKER 110
TKER 111
TKER 112
TKER 113
TKER 114
TKER 115

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SUBROUTINE INCRO

74/74 OPT=1

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1      SUBROUTINE INCRO(AX,AY,AZ,AX1,AY1,AZ1,AX2,AY2,AZ2,GAMS,GAMSIG,LHS, INCRD 2
      1IR, NFF, IO, NBXS, NCPNB, NDBLE, NBV, DELR, DELI, FL, BETA, SDELX, DELY, KRR) INCRD 3
      C COMBINED KERNEL-INTEGRATION PROGRAM
      REAL   K10, K20, K1RT1, K1IT1, K2RT2P, K2IT2P, K10T1, K20T2P
      COMMON /DLM/ K10, K20, K1RT1, K1IT1, K2RT2P, K2IT2P, K10T1, K20T2P, E2
      COMMON /COMA/ LC(40) , CR
      DIMENSION SDELX(400), DELY(400)
      DIMENSION XUSE((30,2), XUSE2((30,2), XUSE3((30,2), XUSE4((30,2)
      DIMENSION USE1((30,2), USE2((30,2), USE3((30,2), USE4((30,2)
      REAL   M, KKR, KKI, KR
      NFF = 0
      M = SQRT(1.0 - BETA**2)
      BR = 12.0 * CR
      EPS = 0.00001
      XDELX = SDELX(IR)
      XDELY = DELY(IR)
      SFN = SIN(GAMSIG)
      CFN = COS(GAMSIG)
      EE = 0.5*XDELY
      E2 = EE*2
      KKR = 0.0
      KKI = 0.0
      DELR = 0.0
      DELI = 0.0
      AT1S = 0.0
      AT2S = 0.0
      T1 = 0.0
      T2 = 0.0
      COUNT = 0.
      XO=AX
      YO=AY
      ZO=AZ
      IF (NFF.EQ.0) GO TO 80
      CALL  KERNEL(XO,YO,ZO,KR,BR,GAMS,GAMSIG,M,EPS,T1,T2)
      35     DELR = KKR
      DELI = KKI
      GO TO 260
      80 CONTINUE
      CALL  KERNEL(XO,YO,ZO,KR,BR,GAMS,GAMSIG,M,EPS,T1,T2)
      40     AT1 = ABS(T1)
      AT2 = ABS(T2)
      IF (AT1.GT.AT1S) AT1S=AT1
      IF (AT2.GT.AT2S) AT2S=AT2
      IF ((COUNT)>30,90,150
      90    DKRC = K1RT1 - K10T1
      DKIC = K1IT1
      XKRC = K2RT2P-K20T2P
      XKIC = K2IT2P
      AT2 = ABS(T2)
      JQ = 1
      IF (NDBLE.NE.0) JQ = 2
      IF (IR.LE.NCPNB) GO TO 110
      IF (IR.GT.NBXS) GO TO 110
      IF (LHS.NE.0) GO TO 100
      DKRI = USE((IO,JQ)
      DKII = USE((IO,JQ)
      INCRD 4
      INCRD 5
      INCRD 6
      INCRD 7
      INCRD 8
      INCRD 9
      INCRD 10
      INCRD 11
      INCRD 12
      INCRD 13
      INCRD 14
      INCRD 15
      INCRD 16
      INCRD 17
      INCRD 18
      INCRD 19
      INCRD 20
      INCRD 21
      INCRD 22
      INCRD 23
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      INCRD 53
      INCRD 54
      INCRD 55
      INCRD 56
      INCRD 57
      INCRD 58
      45
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SUBROUTINE	INCRO	74/74	OPT=1	FTN 4.8+577	85/01/23 . 08 . 10 . 44	PAGE	2
XKRI	*	XUSE1(I0,JO)				INCRO	59
XKII	-	XUSE2(I0,JO)				INCRO	60
XO	-	AX2				INCRO	61
YO	-	AY2				INCRO	62
Z0	-	AZ2	CALL KERNEL(XO,YO,Z0,KR,BR,GAMS,GAMSIG,M,EPS,T1,T2)			INCRO	63
		AT1 = ABS(T1)				INCRO	64
		AT2 = ABS(T2)				INCRO	65
60		IF (AT1.GT.AT1S) AT1S=AT1				INCRO	66
65		IF (AT2.GT.AT2S) AT2S=AT2				INCRO	67
		DKRO = K1RT1 - K1OT1				INCRO	68
		DKIO = K1IT1				INCRO	69
		XKRO = K2RT2P-K2OT2P				INCRO	70
		XKIO = K2IT2P				INCRO	71
		GO TO 170				INCRO	72
		100 XO = AX1				INCRO	73
		YO = AY1				INCRO	74
		Z0 = AZ1	CALL KERNEL(XO,YO,Z0,KR,BR,GAMS,GAMSIG,M,EPS,T1,T2)			INCRO	75
75		AT1 = ABS(T1)				INCRO	76
		AT2 = ABS(T2)				INCRO	77
		IF (AT1.GT.AT1S) AT1S=AT1				INCRO	78
80		IF (AT2.GT.AT2S) AT2S=AT2				INCRO	79
		DKRI = K1RT1 - K1OT1				INCRO	80
		DKII = K1IT1				INCRO	81
		XKRI = K2RT2P-K2OT2P				INCRO	82
		XKII = K2IT2P				INCRO	83
		DKRO = USE3(I0,JO)				INCRO	84
85		DKIO = USE4(I0,JO)				INCRO	85
		XKRO = XUSE3(I0,JO)				INCRO	86
		XKIO = XUSE4(I0,JO)				INCRO	87
		GO TO 160				INCRO	88
		110 CONTINUE				INCRO	89
		COUNT =-1.				INCRO	90
90		120 XO = AX1				INCRO	91
		YO = AY1				INCRO	92
		Z0 = AZ1				INCRO	93
		GO TO 80				INCRO	94
95		130 DKRI = K1RT1 - K1OT1				INCRO	95
		DKII = K1IT1				INCRO	96
		XKRI = K2RT2P-K2OT2P				INCRO	97
		XKII = K2IT2P				INCRO	98
		140 COUNT = 1.				INCRO	99
		XO=AX2				INCRO	100
		YO=AY2				INCRO	101
		Z0=AZ2				INCRO	102
		GO TO 80				INCRO	103
105		150 DKRO = K1RT1 - K1OT1				INCRO	104
		DKIO = K1IT1				INCRO	105
		XKRO = K2RT2P-K2OT2P				INCRO	106
		XKIO = K2IT2P				INCRO	107
		JO = 1				INCRO	108
110		IF (NDBLE.NE.0) JO = 2				INCRO	109
		IF (LHS.EQ.0) GO TO 170				INCRO	110
		160 USE3(I0,JO) = DKRI				INCRO	111
		USE4(I0,JO) = DKII				INCRO	112
		XUSE3(I0,JO)= XKRI				INCRO	113

SUBROUTINE INCRO 74/74 OPTI=1 FIN 4.8+577

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```

115 XUSE4(I0,J0)= XKII
      GO TO 180
170 USE1(I0,J0)= DKRO
      USE2(I0,J0)= DKIO
      XUSE1(I0,J0)= XKRO
      XUSE2(I0,J0)= XKIO
180 CONTINUE
      XO = AX
      YO = AY
      ZO = AZ
      ZERO = 0.0
      XIJ1JR= 0.
      XIJ1JI= 0.
      DJ1JR= 0.0
      DJ1JI= 0.0
      PI = 3.1415926
      XMULT = ((XDELX)/(8.
      IF ((YO.EQ.ZERO) AN
      IF ((ZO.EQ.ZERO) .
190 ETA01 = YO*CFN + ZO
      ZETO1 = -YO*SFN + ZO
      AZETO = ABS(ZETO1)
      IF (AZETO.LE.0.0001
      R1SQX = ETA01**2 +
210 ARE = (DKRI -2.*DKR
      AIM = (DKII -2.*DKR
      BRE = (DKRD - DKRI)
      BIM = (DKIO - DKII)
      CRE = DKRC
      CIM = DKIC
      GO TO 250
220 ETA01 = 0.0
      ZETO1 = 0.0
      R1SQX = 0.0
      GO TO 210
230 ETA01 = YO*CFN
      ZETO1 = 0.
240 R1SQX = ETA01**2
      GO TO 210
250 CONTINUE
      IF (AT1S.EQ.0.0) G
      CALL IDF1 (EE
      R1
1      DELR = XMULT*XIIJR
      DEIJ = XMULT*XIIJI
255 CONTINUE
      IF (AT2S.EQ.0.0) G
      A2R = (XKRI - 2.0*
      A2I = (XKII - 2.0*
      B2R = (XKRO - XKRI
      B2I = (XKIO - XKII
      C2R = XKRC
      C2I = XKIC
      CALL IDF2(EE,
      R1
1      DELR = DELR + XMULT*
      R1S
      DELR = DELR - XMULT*
      R1S
1      DELR = DELR + XMULT*
      R1S

```

```

      SUBROUTINE INCRD      74/74      OPT=1
      C
      C
      C FORMATS
      C
      10 FORMAT (1HO,6E20.8)
      C 260 RETURN
      END

```

FTN 4.8+577	85/01/23. 08.10.44	PAGE 4
DEFINED	140	173
DEFINED	139	173
2*66	2*79	DEFINED 41
66	79	DEFINED 26
2*67	2*80	168
50	65	168
67	80	DEFINED 27
122	DEFINED 1	44
92	DEFINED 1	
101	DEFINED 1	
123	DEFINED 1	
93	DEFINED 1	
102	DEFINED 1	
124	DEFINED 1	
DEFINED	136	
94	DEFINED 1	
103	DEFINED 1	
DEFINED	163	
DEFINED	162	
DEFINED	1	
DEFINED	142	
40	63	
DEFINED	141	
DEFINED	165	
DEFINED	164	
135	150	
DEFINED	144	
DEFINED	30	
13	91	100
DEFINED	143	
DEFINED	167	
DEFINED	166	
DEFINED	1	
DEFINED	1	
DEFINED	1	
16	DEFINED 1	
171	DEFINED 1	
	129	

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS 3	DEF LINE 1	REFERENCES 178	
VARIABLES	SN	TYPE	RELOCATION
575 AIM		REAL	
574 ARE		REAL	
542 AT1		REAL	
532 AT1S		REAL	
543 AT2		REAL	
533 AT2S		REAL	
O AX		REAL	F.P.
O AX1		REAL	F.P.
O AX2		REAL	F.P.
O AY		REAL	F.P.
O AY1		REAL	F.P.
O AY2		REAL	F.P.
O AZ		REAL	F.P.
572 AZETO		REAL	F.P.
O AZ1		REAL	F.P.
O AZ2		REAL	F.P.
603 A21		REAL	
602 A2R		REAL	
O BETA		REAL	F.P.
577 BIM		REAL	
523 BR		REAL	
576 BRE		REAL	
605 B21		REAL	
604 B2R		REAL	
530 CFN		REAL	
601 CIM		REAL	
536 COUNT		REAL	
50 CR		REAL	COMA
600 CRE		REAL	
607 C2I		REAL	
606 C2R		REAL	
O DEL1		REAL	F.P.
O DELR		REAL	F.P.
O DELY		REAL	F.P.
665 DTTRIT		ARRAY	

SUBROUTINE INCRO		74/74	OPT=1	FTN 4.8+577	85/01/23 . 08.10.44	PAGE
VARIABLES	SN	TYPE	RELOCATION	REFS	168	5
564	DIJUR	REAL	REFS	140	170	128
545	DKIC	REAL	REFS	144	144	47
552	DKII	REAL	REFS	113	140	57
556	OKIO	REAL	REFS	118	140	82
544	DKRC	REAL	REFS	139	142	86
551	DKRI	REAL	REFS	112	140	97
555	DKRO	REAL	REFS	117	139	96
531	EE	REAL	REFS	21	141	105
524	EPS	REAL	DEFINED	20	142	168
570	ETAU1	REAL	REFS	35	156	165
10	E2	REAL	DLM	150	156	164
0	FL	REAL	*UNUSED	REFS	5	163
0	GAMS	REAL	F.P.	21	140	146
0	GAMSIG	REAL	F.P.	REFS	35	168
0	IO	INTEGER	F.P.	REFS	17	168
0	IR	INTEGER	F.P.	DEFINED	1	168
550	JO	INTEGER	F.P.	REFS	88	168
522	KKI	REAL	DLM	120	168	168
521	KKR	REAL	DLM	112	168	168
0	KR	REAL	DLM	113	168	168
3	K1IT1	REAL	REFS	56	168	168
2	K1RT1	REAL	REFS	57	168	168
0	K1O	REAL	REFS	58	168	168
6	K1OT1	REAL	REFS	59	168	168
5	K2IT2P	REAL	REFS	60	168	168
4	K2RT2P	REAL	REFS	61	168	168
1	K2O	REAL	REFS	62	168	168
7	K2OT2P	REAL	REFS	63	168	168
0	LC	INTEGER	ARRAY	COMA	64	168
0	LHS	INTEGER	ARRAY	F.P.	65	168
520	M	REAL	REFS	66	168	168
0	NBV	INTEGER	*UNUSED	DEFINED	12	168
0	N5XS	INTEGER	F.P.	REFS	67	168
0	NCPNB	INTEGER	F.P.	REFS	68	168
0	NOBLE	INTEGER	F.P.	REFS	69	168
0	NFF	INTEGER	F.P.	REFS	70	168
566	PI	REAL	REFS	71	168	168
573	R1SQX	REAL	ARRAY	F.P.	72	168
0	SDELX	REAL	REFS	73	168	168
527	SFN	REAL	REFS	74	168	168
534	T1	REAL	DEFINED	75	168	168
535	T2	REAL	REFS	76	168	168
1170	USE1	REAL	ARRAY	REFS	77	168
1264	USE2	REAL	ARRAY	REFS	78	168
1360	USE3	REAL	ARRAY	REFS	79	168

ROUTINE	INCR	74/74	OPT=1	
VARIABLES	SN	TYPE	RELOCATION	
1454 USE4		REAL		
525 XDELX		REAL		
526 XDELY		REAL		
563 XIIUI		REAL		
562 XIIJR		REAL		
547 XKIC		REAL		
554 XKII		REAL		
560 XKIO		REAL		
546 XKRC		REAL		
553 XKRI		REAL		
557 XKRO		REAL		
567 XMULT		REAL	ARRAY	
610 XUSE1		REAL	ARRAY	
704 XUSE2		REAL	ARRAY	
1000 XUSE3		REAL	ARRAY	
1074 XUSE4		REAL	ARRAY	
537 XO		REAL		
540 YO		REAL		
561 ZERO		REAL		
571 ZETO1		REAL		
541 ZO		REAL		
EXTERNALS		TYPE	ARGS	REFERENCES
COS		REAL	1 LIBRARY	18
IDF1	10	FMT	14	156
IDF2	14		168	
KERNEL	11		35	40
SIN		REAL	1 LIBRARY	17
SQRT		REAL	1 LIBRARY	12
INLINE FUNCTIONS		TYPE	ARGS	DEF LINE REFERENCES
ABS		REAL	1 INTRIN	41
				42
STATEMENT LABELS		FMT	NO REFS	DEF LINE REFERENCES
504	10			176
56	80			39
0	90		INACTIVE	34
167	100			45
233	110		INACTIVE	73
0	120			55
242	130		INACTIVE	90
0	140			53
261	150		INACTIVE	92
276	160			45
307	170		INACTIVE	117
317	180			72
0	190		INACTIVE	121
0	200			116
350	210		INACTIVE	134
366	220			45
371	230		INACTIVE	138
0	240			89
175	250		INACTIVE	146

ROUTINE	INCR	74/74	OPT=1		FTN 4.8+577	85/01/23	08.10.44	PAGE	6
VARIABLES	SN	TYPE	RELOCATION						
1454 USE4		REAL			REFS	9	DEFINED	113	
525 XDELX		REAL			REFS	131	DEFINED	15	
526 XDELY		REAL			REFS	20	DEFINED	16	
563 XIIUI		REAL			REFS	156	DEFINED	127	
562 XIIJR		REAL			REFS	156	DEFINED	126	
547 XKIC		REAL			REFS	163	DEFINED	49	
554 XKII		REAL			REFS	115	DEFINED	59	
560 XKIO		REAL			REFS	120	DEFINED	71	
546 XKRC		REAL			REFS	162	DEFINED	48	
553 XKRI		REAL			REFS	114	DEFINED	58	
557 XKRO		REAL			REFS	119	DEFINED	70	
567 XMULT		REAL	ARRAY		REFS	158	DEFINED	171	
610 XUSE1		REAL	ARRAY		REFS	8	DEFINED	119	
704 XUSE2		REAL	ARRAY		REFS	8	DEFINED	120	
1000 XUSE3		REAL	ARRAY		REFS	8	DEFINED	114	
1074 XUSE4		REAL	ARRAY		REFS	8	DEFINED	115	
537 XO		REAL			REFS	35	DEFINED	31	
540 YO		REAL			REFS	73	DEFINED	60	
561 ZERO		REAL			REFS	35	DEFINED	119	
571 ZETO1		REAL			REFS	150	DEFINED	119	
541 ZO		REAL			REFS	2*132	DEFINED	120	
EXTERNALS		TYPE	ARGS	REFERENCES					
COS		REAL	1 LIBRARY	18					
IDF1	10	FMT	14	156					
IDF2	14		168						
KERNEL	11		35	40					
SIN		REAL	1 LIBRARY	17					
SQRT		REAL	1 LIBRARY	12					
INLINE FUNCTIONS		TYPE	ARGS	DEF LINE REFERENCES					
ABS		REAL	1 INTRIN	41					
				42					
STATEMENT LABELS		FMT	NO REFS	DEF LINE REFERENCES					
504	10			176					
56	80			39					
0	90		INACTIVE	46					
167	100			73					
233	110		INACTIVE	90					
0	120			92					
242	130		INACTIVE	96					
0	140			100					
261	150		INACTIVE	105					
276	160			112					
307	170		INACTIVE	117					
317	180			121					
0	190		INACTIVE	134					
0	200		INACTIVE	138					
350	210			139					
366	220		INACTIVE	146					
371	230			150					
0	240		INACTIVE	152					
175	250			154					

SUBROUTINE INCRO

74/74 OPT=1

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STATEMENT LABELS

404 255  
431 260

DEF LINE

160 155  
178 38

REFERENCES

161

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)  
DLM 9 O K1O (1)  
COMA 4.1 3 K1IT1 (1)  
6 K1OT1 (1)  
O LC (40)

1 K2O (1)  
4 K2RT2P (1)  
7 K2OT2P (1)  
40 CR (1)

2 K1RT1 (1)  
5 K2IT2P (1)  
8 E2 (1)

STATISTICS

PROGRAM LENGTH  
CM LABELED COMMON LENGTH  
52000B CM USED

1550B 872  
62B 50

SUBROUTINE KERNEL 74/74 OPT=1

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1 SUBROUTINE KERNEL(XO,YO,ZO,KR,BR,GAMS,GAMSIG,M,EPS,T1,T2)

REAL M, KR, KKI, IODR, IOOI, JODR, JOOI, I10I, I10R, I20R3,  
1 I20I3, IODR, IOOI, JODR, JOOI, I1UI, I1UR, I2UI3,

2 K1, MU1, MU, K2

REAL K1O, K2O, K1RT1, K1IT1, K2RT2P, K2IT2P, K1OT1, K2RT2P, K2IT2P

COMMON /DLIM/, K1O, K2O, K1RT1, K1IT1, K2RT2P, K2IT2P, K1OT1, K2OT2P, E2

PI = 3.1415926

K1O = 0.0

K2O = 0.0

K1RT1 = 0.0

K1IT1 = 0.0

K2RT2P = 0.0

K2IT2P = 0.0

K1OT1 = 0.0

K2OT2P = 0.0

R1=SQRT (YO\*YO+ZO\*ZO)

R1S = R1

IF ( R1 ) 100, 100, 200

100, IF ( XO ) 110, 120, 120

110 KKR=0.

KKI=0.

GO TO 905

120 C1= KR\*XO/BR

T1= COS(GAMS-GAMSIG)

KKR= 2.\*((CDS(C1)-1.)\*T1

KKI=-2.\*SIN(C1)\*T1

K1O = 2.0

K1RT1 = 2.0\*T1\*COS(C1)

K1IT1 = -2.0\*T1\*SIN(C1)

K1OT1 = 2.0\*T1

GO TO 905

200 C1=COS(GAMS)

C2=SIN(GAMS)

C3=COS(GAMSIG)

C4=SIN(GAMSIG)

T2P=(ZO\*ZO+C1\*C3+YO\*YO+C2\*C4-ZO\*YO\*(C2\*C3+C1\*C4))

T2 = T2P/E2

IF ( ABS(T2)-EPS ) 210, 220, 220

210 ICHUZ=1

T1= COS(GAMS-GAMSIG)

T2=0.

GO TO 300

220 T1= COS(GAMS-GAMSIG)

IF ( ABS(T1)-EPS ) 230, 240, 240

230 ICHUZ=2

T1FO.

GO TO 300

240 ICHUZ=3

300 BETA2 = (1.-M\*M)

BIGR = SQRT (XO\*YO+BETA2\*R1\*R1)

K1= KR\*R1/BR

MU1= (M\*BIGR-XO)/ (BETA2\*R1)

MU=ABS(MU1)

K2=K1\*K1

IF ( MU1 ) 310, 320, 330

GO TO 330

KERNEL

```

59 KERNEL
60   KERNEL
61   KERNEL
62   KERNEL
63   KERNEL
64   KERNEL
65   KERNEL
66   KERNEL
67   KERNEL
68   KERNEL
69   KERNEL
70   KERNEL
71   KERNEL
72   KERNEL
73   KERNEL
74   KERNEL
75   KERNEL
76   KERNEL
77   KERNEL
78   KERNEL
79   KERNEL
80   KERNEL
81   KERNEL
82   KERNEL
83   KERNEL
84   KERNEL
85   KERNEL
86   KERNEL
87   KERNEL
88   KERNEL
89   KERNEL
90   KERNEL
91   KERNEL
92   KERNEL
93   KERNEL
94   KERNEL
95   KERNEL
96   KERNEL
97   KERNEL
98   KERNEL
99   KERNEL
100  KERNEL
101  KERNEL
102  KERNEL
103  KERNEL
104  KERNEL
105  KERNEL
106  KERNEL
107  KERNEL
108  KERNEL
109  KERNEL
110  KERNEL
111  KERNEL
112  KERNEL
113  KERNEL
114  KERNEL
115  KERNEL

320 ICHUZ-ICHUZ+6
C (N*C)**2 FOR N=1,11 AND C=.372 =
C
C   .138384    .553536    1.245456    2.214144
C   3.4596     4.981824    6.780816    8.856576
C 11.209104    13.8384    16.744464
C
C (N*C) FOR N=1,12 AND 14,16,18,20,22 =
C
C   .744      1.116      1.488      1.86
C   2.604     2.976      3.348      3.72
C   4.464     5.208      5.952      6.696
C   8.184
C
C A(N) FORN(=1,11 =
C
C   24186198    -2.7918027   24.991079   -111.59196
C   271.43549   -305.75288   -41.18363   545.98537
C   -644.78155  -328.72755  -64.279511
C
C 330 F= EXP (- .372*MU)
C
C1 = .138384+K2
C2 = .553536+K2
C3 = 1.245456+K2
C4 = 2.214144+K2
C5 = 3.4596+K2
C6 = 4.981824+K2
C7 = 6.780816+K2
C8 = 8.856576+K2
C9 = 11.209104+K2
C10 = 13.8384+K2
C11 = 16.744464+K2
C
R1 = .24186198 / C1
R2 = -2.7918027 / C2
R3 = 24.991079 / C3
R4 = -111.59196 / C4
R5 = 271.43549 / C5
R6 = -305.75288 / C6
R7 = -41.18363 / C7
R8 = 545.98537 / C8
R9 = -644.78155 / C9
R10 = 328.72755 / C10
R11 = -64.279511 / C11
C
IF ( ICHUZ .LT. 4 )
100R = .372*(R1 +2.*R2 + 3.*R3 + 4.*R4 + 5.*R5 + 6.*R6 + 7.*R7 +
1          8.*R8 + 9.*R9 + 10.*R10 + 11.*R11)
100I = -K1*(R1+R2+R3+R4+R5+R6+R7+R8+R9+R10+R11)
C
340 GO TO (420,350,390,350,380,350,350),ICHUZ
C
C50 Q1 = R1/ C1
C52 = R2/ C2
C53 = R3/ C3
C54 = R4/ C4
C55 = R5/ C5

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SUBROUTINE KERNEL      74 / 74      OPT = 1

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C4= MU/C3          173
C5= C4/(1.+MU*MU) 174
GO TO (430,440,430,430,440,430,500,500,500,500).ICHUZ
175   I1UR = C2*(1.-C4*K1*IOUR)-C1*K1*IOUR      KERNEL 175
      I1UI = -C2*K1*IOUR-C1*(1 C4+K1*IQUI)      KERNEL 176
      GO TO (500,440,440,460,440,440,500,500,500,500).ICHUZ
      KERNEL 177
      I2UR3 = C2*(2.*(1.-C4)-C5+K1*IQUI+K2*JOUR)+C1*(C6*(1.-C4)-K1*IOUR
      KERNEL 178
      +K2*JQUI)      KERNEL 179
      I2UI3 = C2*(C6*(1.-C4)-K1*IOUR+K2*JQUI)-C1*(2.*(1.-C4)-C5+K1*IQUI
      KERNEL 180
      +K2*JOUR)      KERNEL 181
      GO TO (500,500,500,460,450,500,500,500).ICHUZ
      KERNEL 182
      I2UR3 = 2.0 * I2OR3 - I2UR3      KERNEL 183
      IF ( ICHUZ-6 )      KERNEL 184
      450 CAR = 2.*I1OR-I1UR      KERNEL 185
      460 I1UR= CAR      KERNEL 186
      500 DK1R=0.      KERNEL 187
      R1 = R1S      KERNEL 188
      DK1I=0.      KERNEL 189
      DK2R=0.      KERNEL 190
      DK2I=0.      KERNEL 191
      C3=K1*MU1      KERNEL 192
      C1=COS(C3)      KERNEL 193
      C2=SIN(C3)      KERNEL 194
      C3= M*R1/BIGR      KERNEL 195
      C4=SQRT(1.+MU1*MU1)      KERNEL 196
      C5=KR*X0/BR      KERNEL 197
      C6=COS(C5)      KERNEL 198
      C7=SIN(C5)      KERNEL 199
      GO TO (530,540,530,530,540,530,510,520,510).ICHUZ
      KERNEL 200
      510 I1UR=I1OR      KERNEL 201
      I1UI=I1OI      KERNEL 202
      IF ( ICHUZ-7 )      KERNEL 203
      520 I2UR3= I2OR3      KERNEL 204
      I2UI3= I2O13      KERNEL 205
      IF ( ICHUZ-8 )      KERNEL 206
      530 CK1R = I1UR + C3*C1/C4      KERNEL 207
      CK1I = I1UI - C3*C2/C4      KERNEL 208
      K10 = 1.0 + XO/BIGR      KERNEL 209
      DK1R = CK1R*C6 + CK1I*C7      KERNEL 210
      DK1I = CK1I*C6 - CK1R*C7      KERNEL 211
      GO TO (900,540,540,900,540,540,900,540,540).ICHUZ
      KERNEL 212
      540 G8= (BETA2*(R1/BIGR)**2 + (2.+MU1*C3)/(C4*C4))*(-C3/C4)
      C9= ( K1*C3)*( C3/C4)      KERNEL 213
      CK2R = -I2UR3 + C8*C1 - C9*C2      KERNEL 214
      CK2I = -I2UI3 - C9*C1 - C8*C2      KERNEL 215
      K2O = -2.0 -XO*(2.0+BETA2*(R1/BIGR)**2)/BIGR
      KERNEL 216
      DK2R = CK2R*C6 + CK2I*C7      KERNEL 217
      DK2I = CK2I*C6 - CK2R*C7      KERNEL 218
      900 KKR = T1*DK1R + T2*DK2R      KERNEL 219
      KKI = T1*DK1I + T2*DK2I      KERNEL 220
      K1RT1 = T1 * DK1R      KERNEL 221
      K1IT1 = T1 * DK1I      KERNEL 222
      K2RT2P = T2P* DK2R      KERNEL 223
      K2IT2P = T2P* DK2I      KERNEL 224
      K1OT1 = K10* T1      KERNEL 225
      K2OT2P = K2O* T2P      KERNEL 226
      K1UR= CAR      KERNEL 227
      K2UR= CAR      KERNEL 228
      KFDNE1      KERNEL 229
      905 CONTINUE

```

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C
C      RETURN
230      END

```

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 KERNEL	1	231

VARIABLES	SN	TYPE	RELOCATION	REFS	50	52	213	217	DEFINED	49
			F.P.	REFS	23	50	195	213	2*217	1
0 BR	REAL			REFS DEFINED	186	210	211	197	DEFINED	185
1427 CAR	REAL			REFS	210	211			DEFINED	208
1435 CK1I	REAL			REFS	210	211			DEFINED	207
1434 CK1R	REAL			REFS	218	219			DEFINED	216
1437 CK2I	REAL			REFS	218	219			DEFINED	215
1436 CK2R	REAL			REFS	25	26	28	29	2*36	91
1362 C1	REAL			REFS	142	154	175	178		110
1400 C10	REAL			REFS DEFINED	216	154	176	180		215
1401 C11	REAL			REFS	100	119	142	154	DEFINED	88
1363 C2	REAL			REFS	101	120	142	154	DEFINED	89
1364 C3	REAL			REFS	2*36	92	111	142	DEFINED	175
1365 C4	REAL			REFS	178	180	208	215	DEFINED	176
1373 C5	REAL			REFS	170	194			DEFINED	80
1374 C6	REAL			REFS	194	207	208	212	DEFINED	33
1375 C7	REAL			REFS	194	207	208	214	DEFINED	34
1376 C8	REAL			REFS	171	192	195	197		81
1377 C9	REAL			REFS DEFINED	2*178	94	113	142	154	173
1431 DK1I	REAL			REFS	176	2*180	207	208	3*213	214
1430 DK1R	REAL			REFS	95	114	142	154		175
1433 DK2I	REAL			REFS DEFINED	199	83	173	197		
1432 DK2R	REAL			REFS	96	115	142	154		
1372 E	REAL			REFS	180	210	211	218	DEFINED	169
0 EPS	REAL			REFS	198					170
10 E2	REAL			REFS	97	116	142	154		178
0 GAMS	REAL			REFS DEFINED	219	85	199	210		168
1431 DK1I	REAL			REFS	98	117	142	154		168
1430 DK1R	REAL			REFS DEFINED	86	213				
1433 DK2I	REAL			REFS	99	118	142	154		
1432 DK2R	REAL			REFS DEFINED	87	214				
1372 E	REAL			REFS	221	223				
0 EPS	REAL			REFS	220	222				
10 E2	REAL			REFS	221	225				
0 GAMS	REAL			REFS	220	224				
1431 DK1I	REAL			REFS	11*142	11*154	11*161	11*165	DEFINED	189
1430 DK1R	REAL			REFS	38	44				187
1433 DK2I	REAL			REFS	6	37				191
1432 DK2R	REAL			REFS	24	32	33	40	DEFINED	190
1372 E	REAL			REFS						218
0 EPS	REAL			REFS						219
10 E2	REAL			REFS						219
0 GAMS	REAL			REFS						219
1431 DK1I	REAL			REFS						219
1430 DK1R	REAL			REFS						219
1433 DK2I	REAL			REFS						219
1432 DK2R	REAL			REFS						219
1372 E	REAL			REFS						219
0 EPS	REAL			REFS						219
10 E2	REAL			REFS						219
0 GAMS	REAL			REFS						219

SUBROUTINE KERNEL	74/74	OPT=1	
VARIABLES	SN	TYPE	RELOCATION
O GAMSIG		REAL	F P.
1367 ICHUZ		INTEGER	
1344 IOU1		REAL	
1343 IOUR		REAL	
1334 I001		REAL	
1333 I00R		REAL	
1350 I1UI		REAL	
1347 I1UR		REAL	
1340 I10I		REAL	
1337 I10R		REAL	
1352 I2UI3		REAL	
1351 I2UR3		REAL	
1342 I20I3		REAL	
1341 I20R3		REAL	
1346 JOU1		REAL	
1345 JOUR		REAL	
1336 JOO1		REAL	
1335 JOOR		REAL	
1332 KKI		REAL	
1331 KKR		REAL	
O KR		REAL	
1353 K1		REAL	
3 K1IT1		REAL	DLM
2 K1RT1		REAL	DLM
O K10		REAL	DLM
6 K1OT1		REAL	DLM
1356 K2		REAL	
5 K2IT2P		REAL	DLM
4 K2RT2P		REAL	DLM
1 K20		REAL	DLM
7 K2OT2P		REAL	DLM
O M		REAL	F.P.
1355 MU		REAL	
1354 MU1		REAL	
1357 PI	*	REAL	
1414 Q1		REAL	
1425 Q10		REAL	
1426 Q11		REAL	
1415 Q2		REAL	
1416 Q3		REAL	
1417 Q4		REAL	
1420 Q5		REAL	
1421 Q6		REAL	
1422 Q7		REAL	
1423 Q8		REAL	

VARIABLES	SN	TYPE	RELOCATION	FTN 4.8+577	85/01/23. 08.10.44	PAGE	6
VARIABLES	SN	TYPE	RELOCATION	FTN 4.8+577	85/01/23. 08.10.44	PAGE	6
O GAMSIG		REAL	F P.	1	34	40	43
1367 ICHUZ		INTEGER		1	24	103	122
1344 IOU1		REAL		1	56	177	184
1343 IOUR		REAL		1	140	174	175
1334 I001		REAL		2	212	39	48
1333 I00R		REAL		2	REFS	175	178
1350 I1UI		REAL		2	REFS	165	176
1347 I1UR		REAL		2	REFS	161	175
1340 I10I		REAL		2	REFS	161	176
1337 I10R		REAL		2	REFS	161	176
1352 I2UI3		REAL		2	REFS	161	176
1351 I2UR3		REAL		2	REFS	161	176
1342 I20I3		REAL		2	REFS	161	176
1341 I20R3		REAL		2	REFS	161	176
1346 JOU1		REAL		2	REFS	161	176
1345 JOUR		REAL		2	REFS	161	176
1336 JOO1		REAL		2	REFS	161	176
1335 JOOR		REAL		2	REFS	161	176
1332 KKI		REAL		2	REFS	161	176
1331 KKR		REAL		2	REFS	161	176
O KR		REAL		2	REFS	161	176
1353 K1		REAL		2	REFS	161	176
3 K1IT1		REAL	DLM	1	192	154	134
2 K1RT1		REAL	DLM	1	192	214	214
O K10		REAL	DLM	1	REFS	5	5
6 K1OT1		REAL	DLM	1	REFS	5	6
1356 K2		REAL	DLM	1	REFS	5	6
5 K2IT2P		REAL	DLM	1	11*142	2*178	2*175
4 K2RT2P		REAL	DLM	1	REFS	5	6
1 K20		REAL	DLM	1	REFS	5	6
7 K2OT2P		REAL	DLM	1	REFS	5	6
O M		REAL	DLM	1	REFS	2	2*49
1355 MU		REAL	F.P.	1	REFS	2	77
1354 MU1		REAL		1	2*173	53	55
1357 PI	*	REAL		1	REFS	2	52
1414 Q1		REAL		1	REFS	7	52
1425 Q10		REAL		1	REFS	124	132
1426 Q11		REAL		1	REFS	124	132
1415 Q2		REAL		1	REFS	124	132
1416 Q3		REAL		1	REFS	124	132
1417 Q4		REAL		1	REFS	124	132
1420 Q5		REAL		1	REFS	124	132
1421 Q6		REAL		1	REFS	124	132
1422 Q7		REAL		1	REFS	124	132
1423 Q8		REAL		1	RFFS	124	132

SUBROUTINE QUAD

FIN 4.05//

03/01/23. 00. 10. 49

RAUL

```

MT = MM          59
REWIND MT        60
NIN = NI         61
REWIND NIN        62
NOUT = NO         63
REWIND NOUT        64
MP1 = M + 1       65
NN = N           66
NEL = NPM         67
QUAS             68
QUAS             69
QUAS             70
QUAS             71
QUAS             72
QUAS             73
QUAS             74
QUAS             75
QUAS             76
QUAS             77
QUAS             78
QUAS             79
QUAS             80
QUAS             81
QUAS             82
QUAS             83
QUAS             84
QUAS             85
QUAS             86
QUAS             87
QUAS             88
QUAS             89
QUAS             90
QUAS             91
QUAS             92
QUAS             93
QUAS             94
QUAS             95
QUAS             96
QUAS             97
QUAS             98
QUAS             99
QUAS            100
QUAS            101
QUAS            102
QUAS            103
QUAS            104
QUAS            105
QUAS            106
QUAS            107
QUAS            108
QUAS            109
QUAS            110
QUAS            111
QUAS            112
QUAS            113
QUAS            114
QUAS            115

MT = MM
REWIND MT
NIN = NI
REWIND NIN
NOUT = NO
REWIND NOUT
MP1 = M + 1
NN = N
NEL = NPM

C STORE AIC'S ON TEMPORARY UNIT
C LTAPES = LTAPE
LTAPE = IUMEMF
CALL PUDLAB (8*QUAS 01.LTAP, NAMES, 1, IRDU, JCDU)

C -- CALCULATE THE MAXIMUM NO. OF ROWS. 'K'
C 10 K = (KORE - NEL) / NEL
C -- TEST TO SEE IF THE REST OF THE MATRIX WILL FIT IN CORE
C LAST = K GE. NN
IF( NOT. LAST ) GO TO 30
K = NN
B = 3 + MMAX*2
C = 2 * (1 + MMAX - KORE )
KTEMP = (-B + SQRT(B**2 - 4.0* C ) ) / 2.0
IF(KTEMP .GE. K) GO TO 30

C*** * WE MUST REDUCE THE FINAL K
C K = KTEMP
LAST = .FALSE.

C -- READ 'K' ROWS OF THE AUGMENTED 'A' MATRIX
C 30 NT = 0
DO 40 IB = 1, K
NT = NT + 1
NT = NT + NEL
READ (NIN) (A(1C), IO=NS,NT)
40 CONTINUE
NELP1 = NEL + 1

C -- CHECK TO SEE IF WE WERE UNLUCKY ENOUGH TO END UP WITH ONLY ONE ROW
C 105 C IF (K .EQ. 1) GO TO 56
C -- 'K' IS GREATER THAN '1' SO WE CAN START THE TRIANGULARIZATION
C NS = - NEL
NELP2 = NELP1 + 1

C -- FORM THE 'TRAPEZOIDAL' ARRAY (B)
C DO 50 IB = 2, K

```

SUBROUTINE QUAS 74/74 OPT=1

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1      SUBROUTINE QUASS(ND,MD,KD,NI,MM,NO,NAT,NW,LTAPE,RHSTAP,NPR1,NFILE)
2      *** COMPLEX SOLVIT   QUASI INVERSE
3
4      C      **** *   **** /   **** *   **** *   **** *   **** /   ****
5      C      *** *   *   / *   *   *** *   *   / *   *   / *   *** *   *
6      C      *** *   / *   *   *   *   *** *   *   / *   *   / *   *** *   *
7      C      *   / *** *   *   *   *   *** *   *   / *   *   / *** *   *
8      C
9      C      D I R E C T M A T R I X S O L U T I O N
10     C
11     C      ***LTAPE IS THE TAPE THE L(I,J) MATRIX WILL BE PUT ON
12     C      ***RHSTAP IS THE TAPE THAT THE RIGHT HAND SIDES ARE INPUT ON
13     C      COMPLEX A(2000), SUM
14
15     C      INTEGER RHSTAP
16
17     C      DIMENSION ITAPES(50),IFILES(50)
18     C      DIMENSION DUMMY(4000)
19     C      DIMENSION NAMES(2), NAME(2)
20     C      DIMENSION IOS(98)
21
22     C      COMMON / CTAPES / ITAPES
23     C      COMMON /CFILES/ KFILES,IFILES
24     C      COMMON /PLACES/ IOS
25
26     C      LOGICAL JPASS1
27     C      LOGICAL LASTRS
28     C      LOGICAL LAST
29
30     C      DATA NAMES /4HTTEMP,4HAICS/
31
32     C      IRDU = 99999
33     C      JCDU = 99999
34     C      IUMEMF = IOS(49)
35     C      1 CONTINUE
36     C      NATAPE = NAT
37     C      REWIND NATAPE
38     C      REWIND NW
39
40     C      ITAPEW = ITAPES(6)
41
42     C
43
44     C      N = ND
45     C      KORE = KD
46     C      *** * RHSTAP = 0 IF THERE ARE NO RHS TO BE PROCESSED THIS RUN
47     C      IF (RHSTAP .NE. 0 )GO TO 5
48     C      MRHS = J
49     C      GO TO 6
50
51     C      REWIND RHSTAP
52     C      READ(RHSTAP)MRHS
53     C      6 M = KORE / N - 1
54     C      MMAX = MINO(MRHS,M)
55     C      NPM = N + MMAX
56     C      IF (MAX0(3 * NPM, M + N) .GT. KORE) RETURN
57     C      NPM = O

```

SUBROUTINE SNPDF

VARIABLES SN TYPE

227	VY	REAL
230	VZ	REAL
231	WW	REAL
0	XO	REAL
170	XOB	REAL
0	YO	REAL
0	ZO	REAL

EXTERNALS SQRT

INLINE FUNCTIONS ABS

STATEMENT LABELS

110	30	REAL
0	40	REAL
114	50	REAL
121	60	REAL
0	70	REAL

STATISTICS

PROGRAM LENGTH

52000B CM USED

REFS

ENTRY	POINTS	DEF	LINE	REFERENCES
3	SNPDE	1		54

VARIABLES	SN	TYPE	RELOCATION	
214	ACAB	REAL		
215	ACBB	REAL		
0	BETA	REAL	F . P.	
201	CAB	REAL		
216	CACB	REAL		
204	CAO	REAL		
224	CAODNE	REAL		
162	CAVE	REAL		
202	CBB	REAL		
203	CBI	REAL		
0	CGR	REAL		
0	CGS	REAL		
0	CL	REAL		
164	CLCGS	REAL		
163	CLSGS	REAL		
0	CV	REAL		
206	DBX	REAL		
207	DBY	REAL		
210	DBZ	REAL		
211	DB2	REAL		
0	D1J	REAL		
212	D12	REAL		
213	D02	REAL		
0	EE	REAL	F . P.	
165	EX	REAL		
166	EY	REAL		
167	EZ	REAL		
2~1	ONECBI	REAL		
205	RICAB	REAL		
174	RIMAG	REAL		
171	RIX	REAL		
172	RIY	REAL		
173	RIZ	REAL		
200	ROMAG	REAL		
175	ROX	REAL		
176	ROY	REAL		
177	ROZ	REAL		
0	SGR	REAL		
0	SGS	REAL		
0	SL	REAL		
0	TL	REAL	F . P.	
217	VBY	REAL		
220	VBZ	REAL		
222	VIY	REAL		
223	VIZ	REAL		
225	VOY	REAL		
226	VRAY	REAL		
	REFS	DEFINED	28	17
	REFS	DEFINED	29	37
	REFS	DEFINED	1	35
	REFS	21	32	37
	REFS	39	40	47
	REFS	44	20	48
	REFS	45	46	47
	REFS	50	2	45
	REFS	29	34	18
	REFS	41	19	
	REFS	4	1	
	REFS	3	4	
	REFS	17	18	
	REFS	17	18	
	REFS	2	1	
	REFS	25	39	
	REFS	25	40	
	REFS	25	40	
	REFS	32	25	
	REFS	1	50	
	REFS	41	26	
	REFS	44	27	
	REFS	5	6	
	REFS	9	13	
	REFS	10	14	
	REFS	11	15	
	REFS	42	43	
	REFS	22	23	
	REFS	17	19	
	REFS	12	17	
	REFS	12	17	
	REFS	10	17	
	REFS	12	17	
	REFS	11	17	
	REFS	18	20	
	REFS	16	18	
	REFS	16	18	
	REFS	16	18	
	REFS	49	1	
	REFS	3	7	
	REFS	17	18	
	REFS	1	1	
	REFS	5	1	
	REFS	47	39	
	REFS	48	40	
	REFS	47	42	
	REFS	48	45	
	REFS	47	45	
	REFS	48	46	

SUBROUTINE SNPDF

FTN 4.8+577

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```

1      SUBROUTINE SNPDF (SL,CL,TL,SGS,CGR,XO,YO,ZO,EE,DIJ,BETA,CV) SNPDF
      CAVE = CV
      CLSGS = CL*SGS
      CLCGS = CL*CGS
      EX = EE*TL
      EX = EE*CGS
      EZ = EE*SGS
      XOB = XO / BETA
      RIX = XOB+ EX
      RIY = YO + EY
      RIZ = ZO + EZ
      RIMAG = SORT(RIX**2 + RIY**2 + RIZ**2)
      ROX = XOB- EX
      ROY = YO - EY
      ROZ = ZO - EZ
      ROMAG = SQRT(ROX**2 + ROY**2 + ROZ**2)
      CAB = (RIX*SL + RIY*CLCGS + RIZ*CLSGS)/RIMAG
      CBB = (ROX*SL + ROY*CLCGS + ROZ*CLSGS)/ROMAG
      CBI = -RIZ/RIMAG
      CAO = ROX/ROMAG
      RICAB = RIMAG*CAB
      DBX = RIX - RICAB*SL
      DBY = RIY - RICAB*CLCGS
      DBZ = RIZ - RICAB*CLSGS
      DB2 = DBX**2 + DBY**2 + DBZ**2
      D12 = RIY**2 + RIZ**2
      D02 = ROY**2 + ROZ**2
      ACAB = ABS(CAB)
      ACBB = ABS(CBB)
      IF (ACAB.GT..999) GO TO 30
      IF (ACBB.GT..999) GO TO 30
      CACB = (CAB - CBB)/DB2
      GO TO 60
      30 IF (CAB*CBB)40,50,50
      40 CACB = 0.
      GO TO 60
      50 CACB = 0.5*ABS((1./RIMAG**2)-(1./ROMAG**2))
      60 CONTINUE
      VBY = CACB * (DBX*CLSGS - DBZ*SL)
      VBZ = CACB * (DBY*SL - DBX*CLCGS)
      ONECBI = (1.0 - CBI)/D12
      VIY = ONECBI*RIZ
      VIZ = -ONECBI*RIY
      CADONE = (1.0 + CAO)/D02
      VOY = -CADONE*ROZ
      VOZ = CADONE*ROV
      VY = VBY + VIY + VOY
      VZ = VBZ + VIZ + VOZ
      WW= VY*SGR - VZ*CGR
      DIJ = WW* CAVE / 25.132741
      70 CONTINUE
      C
      C      RETURN
      END

```

4

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PAGE

SUBROUTINE IDF2      74/74      OPT=1

STATEMENT	LABELS	DEF LINE	REFERENCE
261	140	74	65
273	170	79	43

STATISTICS  
PROGRAM LENGTH  
520000B CM USED

376B      254

VARIABLES		SN	TYPE	RELOCATION		FTN 4.8+577	85/01/23.	08.10.44	PAGE 3
344	DEN3	REAL	F.P.	DEFINED	15				
0	DIJ1I	REAL	F.P.	DEFINED	1	42	23		
0	DIJ1JR	REAL	F.P.	DEFINED	1	41	78		
0	EE	REAL	F.P.	REFS	11	12	14	16	18
0	ETA01	REAL	F.P.	REFS	19	20	21	25	49
0	ETA01	REAL	F.P.	REFS	57	70	77	23	48
337	ETA02	REAL	F.P.	REFS	49	52	53	DEFINED	1
0	E2	REAL	F.P.	REFS	16	17	73	DEFINED	1
336	FAC1	REAL	REFS	4	11	25	31	8	15
335	FACR	REAL	REFS	52	53	54	57	14	16
345	FAC2A	REAL	REFS	2*	73	75	76	21	23
347	FAC2B	REAL	REFS	40	40	76	DEFINED	1	51
346	FAC3A	REAL	REFS	39	39	75	DEFINED	7	50
350	FAC3B	REAL	REFS	20	20	21	DEFINED	6	64
363	FUNCT	REAL	REFS	22	22	23	DEFINED	16	
334	PARN	REAL	REFS	22	23	23	DEFINED	18	
0	R1SQX	REAL	REFS	39	40	40	DEFINED	17	
360	S	REAL	REFS	64	69	70	DEFINED	19	
361	SER	REAL	REFS	6	7	7	DEFINED	20	
342	TEST	REAL	REFS	4	11	16	5	32	45
357	TESTT	REAL	REFS	54	55	57	DEFINED	1	45
341	TESTO	REAL	REFS	5*30	5*62	60	DEFINED	7	27
367	TRM11	REAL	REFS	31	63	63	DEFINED	29	37
366	TRM1R	REAL	REFS	13	13	12	DEFINED	30	61
352	TRM21	REAL	REFS	28	28	60	DEFINED	2	62
351	TRM2R	REAL	REFS	24	24	24	DEFINED	1	62
354	TRM31	REAL	REFS	42	42	78	DEFINED	11	27
353	TRM3R	REAL	REFS	41	41	77	DEFINED	11	59
373	UP11	REAL	REFS	42	42	78	DEFINED	40	55
372	UP1R	REAL	REFS	41	41	77	DEFINED	39	54
375	UP21	REAL	REFS	42	42	77	DEFINED	21	76
374	UP2R	REAL	REFS	41	41	77	DEFINED	21	75
0	ZETO1	REAL	F.P.	REFS	55	55	55	DEFINED	23
340	ZETO2	REAL	REFS	3	5	5	DEFINED	22	48
			REFS	49	58	64	DEFINED	1	32
			REFS	14	14	15	DEFINED	1	42
			DEFIN	9	17	17		1	70
EXTERNALS		TYPE	ARGS	REFERENCES					
	ATAN	REAL	1 LIBRARY	36	68				
INLINE FUNCTIONS		TYPE	ARGS	DEF LINE	REFERENCES				
ABS	REAL	1 INTRN	3	3	11				
STATEMENT LABELS		DEF LINE	REFERENCES						
137	90	34	28						
144	100	38	33						
157	110	44	24						
161	120	47	10						
243	125	66	60						
		66	60						

SUBROUTINE IDF2 74/74 OPT=1

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```

ARGA = COEF*ZETO1
TESTT = ABS(ARGA)
IF (TESTT GT. 0.3) GO TO 125
S = ARGA**2
SER = 1./3.+S*(-1./5.+S*(1./7.+S*(-1./9.+S*(1./11.-S/13.))))
ALPHA = E2*(COEF**2)*SER
FUNCT = COEF*(1.0-ALPHA)*(ZETO1**2)/E2
GO TO 140
125 CONTINUE
ARGT = COEF*AZET
ATANA = ATAN(ARGT)
FUNCT = ATANA/AZET
ALPHA = (E2/ZETO2)*(1.0-FUNCT*(DEN0/(2.0*EE)))
GO TO 140
130 CONTINUE
ALPHA = ((2.0*E2)/(ETA02-E2))**2
140 CONTINUE
TRM2R = -ALPHA*FACR/E2
TRM2I = -ALPHA*FACI/E2
DI1JR = EE*(TRM1R + TRM2R)/DEN0
DI1JI = EE*(TRM1I + TRM2I)/DEN0
170 CONTINUE
C
C
RETURN
END

```

#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
3	1	82				
VARIABLES	SN	TYPE	RELOCATION			
362 ALPHA	REAL	REAL	REFS	32	64	75
356 ARGA	REAL	REAL	REFS	70	73	76
364 ARGT	REAL	REAL	REFS	27	29	59
365 ATANA	REAL	*UNUSED	REFS	36	68	DEFINED
0 AT2	REAL	F.P.	REFS	37	69	35
332 AZET	REAL	REAL	DEFINED	1	10	11
0 A2I	REAL	F.P.	REFS	3	35	37
0 A2R	REAL	F.P.	REFS	7	21	23
0 B2I	REAL	F.P.	REFS	6	20	22
0 B2R	REAL	F.P.	REFS	7	21	23
355 COEF	REAL	REAL	REFS	6	20	22
0 C2I	REAL	F.P.	REFS	26	31	32
0 C2R	REAL	F.P.	REFS	67	25	57
370 DENA	REAL	REAL	REFS	7	21	23
371 DENB	REAL	REAL	REFS	6	20	22
333 DENO	REAL	REAL	REFS	54	55	DEFINED
343 DEN2	REAL	REAL	REFS	54	55	DEFINED
			REFS	12	70	77
			REFS	20	21	24

SUBROUTINE IDF2 74/74 OPT=1

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PAGE 1

```
1      SUBROUTINE IDF2(EE,E2,AT2,E1A01,ZETO1,A2R,B2R,B2I,C2R,C2I,
     R1SQX,DIIJU,DIIJ1,I)
```

```
AZET = ABS(ZETO1)
```

```
DENO = R1SQX-E2
```

```
PARN = ETAO1**2 + ZETO1**2
```

```
FACR = PARN*A2R + ETAO1*B2R + C2R
```

```
FACI = PARN*A2I + ETAO1*B2I + C2I
```

```
ETAO2 = ETAO1**2
```

```
ZETO2 = ZETO1**2
```

```
IF (AZET.EQ.0.0) GO TO 120
```

```
TEST0 = ABS((R1SQX - E2)/(2.0*EE*ZETO1))
```

```
TEST = ABS((DEN0/(2.0*EE*ZETO1)))
```

```
IF (TEST.GT.0.1) GO TO 120
```

```
DEN2 = (ETAO1+EE)**2+ZETO2
```

```
DEN3 = (ETAO1-EE)**2+ZETO2
```

```
FAC2A = R1SQX*ETAQ1+(ETAQ2-ZETOQ2)*EE
```

```
FAC3A = R1SQX+ETAQ1*EE
```

```
FAC2B = R1SQX-ETAQ1*EE
```

```
FAC3B = (FAC2A*A2R+FAC2B*B2R+(ETAQ1+EE)*C2R)/DEN2
```

```
TRM2R = (FAC2A*A2I+FAC2B*B2I+(ETAQ1+EE)*C2I)/DEN2
```

```
TRM3R = (FAC3A*A2R+FAC3B*B2R+(ETAQ1-EE)*C2R)/DEN3
```

```
TRM3I = (FAC3A*A2I+FAC3B*B2I+(ETAQ1-EE)*C2I)/DEN3
```

```
IF (TEST0.LE.0.0001) GO TO 110
```

```
COEF = (2.0*EE)/(R1SQX-E2)
```

```
ARGA = COEF*ZETO1
```

```
TESTT = ABS(ARGA)
```

```
IF (TESTT.GT.0.3) GO TO 90
```

```
S = ARGA**2
```

```
SER = 1./3.+S*(-1./5.+S*(1./7.+S*(-1./9.+S*(1./11.-S/13.))))
```

```
ALPHA = E2*(COEFF**2)*SER
```

```
FUNCT = COEF*(1.0-ALPHA*(ZETO1**2)/E2)
```

```
GO TO 100
```

```
90 CONTINUE
```

```
ARGT = COEF*A2ET
```

```
ATANA = ATAN(ARGT)
```

```
FUNCT= ATANA/AZET
```

```
100 CONTINUE
```

```
TRM1R= FACR*FUNCT
```

```
TRM1I= FACI*FUNCT
```

```
DIIJ1= (TRM1R + TRM2R + TRM3R)/(2.0*ZETO2)
```

```
DIIJ1I= (TRM1I + TRM2I + TRM3I)/(2.0*ZETO2)
```

```
GO TO 170
```

```
110 CONTINUE
```

```
FUNCT= 0.0
```

```
GO TO 100
```

```
120 CONTINUE
```

```
DENA = (ETAQ1+EE)**2 + ZETO1**2
```

```
DENB = (ETAQ1-EE)**2 + ZETO1**2
```

```
UP1R = 2.0*(E2*B2R + C2R)
```

```
UP1I = 2.0*(E2*A2I + C2I)
```

```
UP2R = 4.0*E2*ETAQ1*B2R
```

```
UP2I = 4.0*E2*ETAQ1*B2I
```

```
TRM1R = (UP1R *(R1SQX+E2) + UP2R )/(DEN0*DENB)
```

```
TRM1I = (UP1I *(R1SQX+E2) + UP2I )/(DEN0*DENB)
```

```
IF (AZET.EQ.0.0) GO TO 130
```

```
COEF = (2.0*EE)/(R1SQX-E2)
```

```
2      IDF2 2
     IDF2 3
     IDF2 4
     IDF2 5
     IDF2 6
     IDF2 7
     IDF2 8
     IDF2 9
     IDF2 10
     IDF2 11
     IDF2 12
     IDF2 13
     IDF2 14
     IDF2 15
     IDF2 16
     IDF2 17
     IDF2 18
     IDF2 19
     IDF2 20
     IDF2 21
     IDF2 22
     IDF2 23
     IDF2 24
     IDF2 25
     IDF2 26
     IDF2 27
     IDF2 28
     IDF2 29
     IDF2 30
     IDF2 31
     IDF2 32
     IDF2 33
     IDF2 34
     IDF2 35
     IDF2 36
     IDF2 37
     IDF2 38
     IDF2 39
     IDF2 40
     IDF2 41
     IDF2 42
     IDF2 43
     IDF2 44
     IDF2 45
     IDF2 46
     IDF2 47
     IDF2 48
     IDF2 49
     IDF2 50
     IDF2 51
     IDF2 52
     IDF2 53
     IDF2 54
     IDF2 55
     IDF2 56
     IDF2 57
     IDF2 58
```

SUBROUTINE IDF1      74/74      OPT=1  
STATISTICS  
PROGRAM LENGTH      201B      129  
52000B CM USED

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SUBROUTINE	IDF	74/74	OPT=1	RELOCATION	F.P.		FTN 4.8+577	85/01/23 . 08 . 10 . 44	PAGE
VARIABLES	SN	TYPE							2
O AIM		REAL		REFS	5	7		14	DEFINED 1
174 ALPHA		REAL		REFS	38	DEFINING 31		37	
O ARE		REAL		REFS	4	6		13	DEFINED 1
167 ARGA		REAL		REFS	21	35		20	
171 ARGT		REAL		REFS	24	DEFINING 23		23	
157 ARG2		REAL		REFS	11	12		10	
172 ATANA		REAL		REFS	25	DEFINING 24		24	
O AT2		REAL		DEFINED	1			25	DEFINED 15
164 AZET		REAL		REFS	16	17		23	
O BIM		REAL		REFS	5	7		6	DEFINED 1
O BRE		REAL		REFS	4	6		1	
O CIM		REAL		REFS	5	DEFINING 4		1	
166 COEF		REAL		REFS	20	23		37	DEFINED 19
O CRE		REAL		REFS	4	DEFINING 10		1	
156 DOWN		REAL		REFS	10	DEFINING 9		9	
O EE		REAL		REFS	8	9		13	
O ETAO1		REAL		DEFINED	1			14	
O E2		REAL		REFS	3	4		5	DEFINED 19
O E2		REAL		REFS	28	DEFINING 17		6	
152 FACI		REAL		REFS	1	19		28	
151 FACR		REAL		REFS	41	DEFINING 1		7	
173 FUNCT		REAL		REFS	40	DEFINING 41		5	
150 PARN		REAL		REFS	40	DEFINING 4		6	DEFINED 3
154 PARNJ		REAL		REFS	12	DEFINING 5		7	
153 PARNR		REAL		REFS	11	DEFINING 12		6	
O R1SQX		REAL		REFS	17	19		19	DEFINED 1
175 S		REAL		REFS	5*36	DEFINING 35		35	
176 SER		REAL		REFS	37	DEFINING 36		36	
170 TEST		REAL		REFS	22	DEFINING 21		22	
165 TESTO		REAL		REFS	18	DEFINING 17		18	
200 TRM1I		REAL		REFS	43	DEFINING 41		43	
177 TRM1R		REAL		REFS	42	DEFINING 40		42	
161 TRM2I		REAL		REFS	43	DEFINING 40		43	
160 TRM2R		REAL		REFS	42	DEFINING 41		42	
163 TRM3I		REAL		REFS	43	DEFINING 40		43	
162 TRM3R		REAL		REFS	42	DEFINING 39		42	
155 UP		REAL		REFS	10	DEFINING 8		10	
O XIJJI		REAL		DEFINED	1	43		43	
O XIIJR		REAL		DEFINED	1	42		42	
O ZETO1		REAL		REFS	3	8		9	DEFINED 1
EXTERNALS		TYPE	ARGS	REFERENCES					
ALOG		REAL	1	LIBRARY 11		12			
ATAN		REAL	1	LIBRARY 24					
INLINE FUNCTIONS	ABS	TYPE	ARGS	DEF LINE REFERENCES	15				
		REAL	1	INTRIN DEF LINE REFERENCES	17				
STATEMENT LABELS			DEF LINE	REFERENCES					
65 100			27	16					
72 110			30	18					
76 120			34	22					
115 170			39	26	29			33	

SUBROUTINE IDE1 1A/74 OPT=1

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```

1      SUBROUTINE IDF1 (EE,E2,AT2,ETA01,ZETO1,ARE,AIM,BRE,BIM,CRE,CIM)
1          R1SQX,XIIJR,XIIIJ)
1
1      PARN = ETA01**2 - ZETO1**2
1      FACR = PARN*ARE + ETA01*BIM + CRE
1      FACI = PARN*AIM + ETA01*BIM + CIM
1      PARNR = BRE/2.0 + ETA01*ARE
1      PARNI = BIM/2.0 + ETA01*AIM
1      UP = (ETA01-EE)**2 + ZETO1**2
1      DOWN = (ETA01+EE)**2 + ZETO1**2
1
1      ARG2 = UP/DOWN
1      TRM2R= PARNR * ALOG(ARG2)
1      TRM2I= PARNI * ALOG(ARG2)
1      TRM3R= 2.0*EE* ARE
1      TRM3I= 2.0*EE* AIM
1
1      AZET = ABS(ZETO1)
1      IF (AZET.EQ.0.0) GO TO 100
1      TESTO= ABS((R1SQX-E2)/(2.0*EE*AZET))
1      IF (TESTO.LE.0.0001) GO TO 110
1      COEF = (2.0*EE)/(R1SQX-E2)
1      ARGA = COEF*ZETO1
1      TEST = ABS(ARGA)
1      IF (TEST.LE.0.3) GO TO 120
1      ARGT = COEF*AZET
1      ATANA= ATAN(ARGV)
1      FUNCT= ATANA/AZET
1      GO TO 170
1
100    CONTINUE
100    FUNCT= (2.0*EE)/(ETA01**2-E2)
100    GO TO 170
110    CONTINUE
110    ALPHA= E2/ZETO1**2
110    FUNCT= 0.0
110    GO TO 170
120    CONTINUE
120    S = ARGA**2
120    SER = 1./3.+S*(-1./5.+S*(1./7.+S*( -1./9.+S*(1./11.-S/13.))))
120
170    CONTINUE
170    TRM1R= FACR * FUNCT
170    TRM1I= FACI * FUNCT
170    XIIJR= TRM1R + TRM2R + TRM3R
170    XIIIJ= TRM1I + TRM2I + TRM3I
170
170    C
170    C
170    RETURN
170

```

### **SYMBOLIC REFERENCE MAP (B=3)**

ENTRY POINTS	DEF LINE	REFERENCES
3 IDEF1	1	46

## SUBROUTINE KERNEL

74/74

OPT=1

## STATEMENT LABELS

	DEF LINE	REFERENCES
144 330	77	55
273 340	108	103
311 350	110	6*108
354 360	124	4*122
427 370	132	2*130
460 380	137	108
462 390	138	108
0 400	140	122
502 410	142	2*122
672 420	161	108
763 430	175	4*174
1011 440	178	2*174
1045 450	183	2*182
1051 460	185	177
1054 500	187	136
1120 510	201	2*200
1125 520	204	200
1132 530	207	4*200
1165 540	213	2*200
1214 900	220	3*212
1231 905	228	22

	DEF LINE	REFERENCES
137	108	122
138	108	122
140	122	2*130
142	108	122
161	108	130
175	4*174	2*140
178	2*174	
183	2*182	
185	177	
187	136	
201	2*200	
204	200	
207	4*200	
213	2*200	
220	3*212	
228	22	

	DEF LINE	REFERENCES
130	108	122
132	108	122
134	108	122
136	108	122
138	108	122
140	122	2*130
142	108	130
161	108	130
175	4*174	
178	2*174	
183	2*182	
185	177	
187	136	
201	2*200	
204	200	
207	4*200	
213	2*200	
220	3*212	
228	22	

	DEF LINE	REFERENCES
130	108	122
132	108	122
134	108	122
136	108	122
138	108	122
140	122	2*130
142	108	130
161	108	130
175	4*174	
178	2*174	
183	2*182	
185	177	
187	136	
201	2*200	
204	200	
207	4*200	
213	2*200	
220	3*212	
228	22	

	DEF LINE	REFERENCES
130	108	122
132	108	122
134	108	122
136	108	122
138	108	122
140	122	2*130
142	108	130
161	108	130
175	4*174	
178	2*174	
183	2*182	
185	177	
187	136	
201	2*200	
204	200	
207	4*200	
213	2*200	
220	3*212	
228	22	

## STATISTICS

PROGRAM LENGTH	MEMBERS - BIAS NAME(LENGTH)
DLM 9	0 K10 (1)
	3 K1T1 (1)
	6 K1OT1 (1)

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108
138	108
140	122
142	108
161	108
175	4*174
178	2*174
183	2*182
185	177
187	136
201	2*200
204	200
207	4*200
213	2*200
220	3*212
228	22

DEF LINE	REFERENCES
130	108
132	108
134	108
136	108

SUBROUTINE KERNEL			74/74	OPT=1	FTN 4.8+577	85/01/23.	08.10.44	PAGE	7
VARIABLES	SN	TYPE	RELOCATION						
1424 Q9	REAL	REAL	REFS	124	132	142	154	DEFINED	118
1360 R1	REAL	REAL	REFS	17	18	2*50	51	DEFINED	104
1361 R15	REAL	REAL	DEFINED	110	161	165	195	DEFINED	217
1412 R10	REAL	REAL	REFS	16	91	167	188	DEFINED	17
1413 R11	REAL	REAL	REFS	167	106	119	161	DEFINED	165
1402 R2	REAL	REAL	REFS	104	104	106	120	DEFINED	161
1403 R3	REAL	REAL	REFS	101	104	106	112	DEFINED	165
1404 R4	REAL	REAL	REFS	104	104	106	113	DEFINED	161
1405 R5	REAL	REAL	REFS	104	104	106	114	DEFINED	165
1406 R6	REAL	REAL	REFS	95	95	106	115	DEFINED	161
1407 R7	REAL	REAL	REFS	104	104	106	117	DEFINED	165
1410 R8	REAL	REAL	REFS	96	98	106	118	DEFINED	161
1411 R9	REAL	REAL	REFS	104	104	106	116	DEFINED	165
0 T1	REAL	F.P.	REFS	99	99	106	116	DEFINED	161
0 T2	REAL	F.P.	REFS	25	25	26	28	DEFINED	220
1366 T2P	REAL	F.P.	REFS	221	222	223	226	DEFINED	1
0 XO	REAL	F.P.	REFS	43	46	46	48	DEFINED	24
0 YO	REAL	F.P.	REFS	38	38	220	221	DEFINED	40
0 ZO	REAL	F.P.	REFS	37	224	225	227	DEFINED	41
EXTERNALS COS	REAL	REAL	REFS	19	23	2*50	52	DEFINED	36
EXP SIN SQRT	REAL	REAL	REFS	1	2*16	3*36	3*36	DEFINED	197
1	REAL	REAL	REFS	2*16	2*16	2*16	2*16	DEFINED	209
INLINE FUNCTIONS ABS	TYPE	ARGS	REFERENCES	25	28	32	34	DEFINED	1
0 100	REAL	1 LIBRARY	198	198	198	198	198	DEFINED	193
0 110	REAL	1 LIBRARY	77	77	77	77	77	DEFINED	170
23 120	REAL	1 LIBRARY	26	29	29	33	33	DEFINED	199
52 200	REAL	1 LIBRARY	16	50	50	171	171	DEFINED	194
0 210	REAL	1 LIBRARY	43	43	43	43	43	DEFINED	196
105 220	REAL	1 LIBRARY	44	44	44	44	44	DEFINED	199
116 240	REAL	1 LIBRARY	48	48	48	48	48	DEFINED	47
117 300	REAL	1 LIBRARY	49	49	49	49	49	DEFINED	55
0 310	REAL	1 LIBRARY	56	56	56	56	56	DEFINED	55
STATEMENT LABELS	TYPE	ARGS	REFERENCES	38	44	44	53	DEFINED	53
0 100	REAL	1 INTRIN	DEF LINE	19	19	18	18	DEFINED	53
0 110	REAL	1 INTRIN	DEF LINE	20	20	19	19	DEFINED	53
23 120	REAL	1 INTRIN	DEF LINE	23	23	2*19	2*19	DEFINED	53
52 200	REAL	1 INTRIN	DEF LINE	32	32	2*18	2*18	DEFINED	53
0 210	REAL	1 INTRIN	DEF LINE	39	39	38	38	DEFINED	53
105 220	REAL	1 INTRIN	DEF LINE	43	43	2*38	2*38	DEFINED	53
116 240	REAL	1 INTRIN	DEF LINE	48	48	2*44	2*44	DEFINED	53
117 300	REAL	1 INTRIN	DEF LINE	49	49	42	42	DEFINED	53
0 310	REAL	1 INTRIN	DEF LINE	56	56	47	47	DEFINED	53

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```

NP = NELP2 - 1B      QUAS 116
NS = NS + NELP1      QUAS 117
NT = NS      QUAS 118
DO 50 IO = 1B, K      QUAS 119
NT = NT + NEL      QUAS 120
MN = NT      QUAS 121
NB = NS      QUAS 122
A(NT) = A(NT) / A(NS)      QUAS 123
DO 50 NF = 2, NP      QUAS 124
MN = MN + 1      QUAS 125
NB = NB + 1      QUAS 126
50 A(MN) = A(MN) - A(NT) * A(NB)      (TRIANGULAR PART)
C*** WRITE PART OF THE MATRIX ON LTAPE      (TRIANGULAR PART)
CALL PUTROW (LTAPE,2,K,1)
LBEG = NELP1      QUAS 127
KM1 = K - 1      QUAS 128
DO 55 IB = 1, KM1      QUAS 129
LEND = LBEG + IB- 1      QUAS 130
MAXW = LEND - LBEG + 1      QUAS 131
CALL PUTROW (LTAPE,2,MAXW,1)      QUAS 132
MAXH = 2*MAXW      QUAS 133
CALL PUTROW (LTAPE,2,A(LBEG),MAXH)      QUAS 134
55 LBEG = LBEG + NN      QUAS 135
C - - WRITE THE 'TRAPEZOIDAL' MATRIX ON TAPE
C
130
      56 NT = 0      QUAS 136
      NP = NEL      QUAS 137
      NS = -NEL      QUAS 138
      DO 60 IO = 1, K      QUAS 139
      NS = NS + NELP1      QUAS 140
      NT = NT + NEL      QUAS 141
      WRITE (MT) NP, (A(IB), IB = NS, NT)
      60 NP = NP - 1      QUAS 142
      IF (LAST) GO TO 90      QUAS 143
      NP = NP - M      QUAS 144
      NS = KORE - NEL + 1      QUAS 145
      C - - READ ANOTHER ROW
      C
135
      DO 80 IO = 1, NP      QUAS 146
      READ (NIN) (A(IB), IB = NS, KORE)
      C - - MODIFY THIS ROW BY THE 'TRAPEZOIDAL' ARRAY
      C
140
      NT = 1      QUAS 147
      MN = NS      QUAS 148
      DO 70 IB = 1, K      QUAS 149
      NB = NT      QUAS 150
      NF = MN + 1      QUAS 151
      A(MN) = A(MN) / A(NT)      QUAS 152
      DO 65 NN = NF, KORE      QUAS 153
      NB = NB + 1      QUAS 154
      65 A(NN) = A(NN) - A(MN) * A(NB)
      MN = NF      QUAS 155
      70 NT = NT + NELP1      QUAS 156
      C
145
      C
150
      C
155
      C
160
      C
165
      C
170
      C
  
```

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C - WRITE THE MODIFIED ROW ON TAPE

C\*\*\* \*\*\*WRITE REST OF LMATRIX ON LTAPE

175 MNM1 = MN - 1

MAXW = MNM1 - NS + 1

CALL PUTROW (LTAPE,2,MAXW,1)

MAXH = 2\*MAXW

CALL PUTROW (LTAPE,2,A(NS),MAXH)

WRITE (NOUT) (A(NT), NT=MN,KORE)

80 CONTINUE

REWIND NOUT

REWIND NIN

C - - SWITCH THE TAPES

C NT = NIN

NIN = NOUT

NOUT = NT

C - - RE-CALCULATE ROW LENGTH AND LOOP BACK

C NEL = NEL - K

NN = NEL - M

GO TO 10

C - - REWIND ALL TAPES

C 90 REWIND NIN

REWIND NOUT

C 105 N1 = KORE - K \* M + 1

IFILES(LTAPE) = NFILE

CALL GEDLAB (8HQQUAS,O1,LTAPE,NAME,1,IRD,JCD)

PWIND MT

C\*\*\* \*\*\*CALCULATE THE NUMBER OF COLUMNS TO BRING OFF OF THE RHS TAPE

MTOTAL = 0

M = MMAX

IF(M .EQ. 0) GO TO 295

109 MTOTAL = MTOTAL + M

LASTR = MTOTAL.GE. MRHS

MTOTAL = MTOTAL - M

IF ((LASTR)M = MRHS - MTOTAL

MTOTAL = MTOTAL + M

C\*\*\* \*\*\*BRING IN M COLUMNS OF RHS

KINIT = KORE - (M\*N)

IINIT = KINIT

NBEG = KINIT + 1

NEND = KINIT+ N

DO 110 J = 1,M

READ (RHSTAP)( A(I), I=NBEG,NEND)

NBEG = NEND + 1

110 NEND = NEND + N

C\*\*\* \*\*\*BRING IN L(I,J) MATRIX AND APPLY IT TO RHS

NBEG = 1 + KINIT

NEND = 1 + (M-1) \* N + KINIT

.....

QUAS 173

QUAS 174

QUAS 175

QUAS 176

QUAS 177

QUAS 178

QUAS 179

QUAS 180

QUAS 181

QUAS 182

QUAS 183

QUAS 184

QUAS 185

QUAS 186

QUAS 187

QUAS 188

QUAS 189

QUAS 190

QUAS 191

QUAS 192

QUAS 193

QUAS 194

QUAS 195

QUAS 196

QUAS 197

QUAS 198

QUAS 199

QUAS 200

QUAS 201

QUAS 202

QUAS 203

QUAS 204

QUAS 205

QUAS 206

QUAS 207

QUAS 208

QUAS 209

QUAS 210

QUAS 211

QUAS 212

QUAS 213

QUAS 214

QUAS 215

QUAS 216

QUAS 217

QUAS 218

QUAS 219

QUAS 220

QUAS 221

QUAS 222

QUAS 223

QUAS 224

QUAS 225

QUAS 226

QUAS 227

QUAS 228

.....

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```

C*** ***DO TRIANGULAR SECTION OF LMATRIX
230      NLCNT = 0
111      CONTINUE
        CALL GETROW (LTAPE, 1, K, 1)
C*** ***NLCNT = NLCNT + 1
C*** ***KSUM IS THE TOTAL NUMBER OF L ROWS THAT WILL
C*** ***BE READ AFTER THIS TRIANGULAR SECTION IS FINISHED
235      KSUM = KSUM + K
      KM1 = K - 1
C*** ***NOTE THAT KM1 CAN'T BE 0 SINCE K CAN'T BE 1 AND STILL HAVE SOM
C*** ***ON THE LTape
240      DO 114 I = 1, KM1
        NBEG = NBEG + 1
      NEND = NEND + 1
C*** ***READ 1 ROW OF L(I,J) FROM LTape---K-1 TIMES---EACH TIME
C*** ***STARTING WITH L(1)
1114     CONTINUE
        CALL GETROW (LTAPE, 1, MAXW, 1)
      MAXH = 2*MAXW
        CALL GETROW (LTAPE, 1, A, MAXH)
      JCNT = -1
C*** ***REDUCE THE RHS BY GOING ACROSS A SOLUTION ROW (WHICH
C*** ***ARE NOT IN CONSECUTIVE ORDER, BUT A(1), A(N+1), A(2N+1) ETC.)
250      DO 113 NPP = NBEG, NEND, N
        JCNT = JCNT + 1
        SUM = (0,0,0)
      NROW = KINIT + (JCNT * N)
      DO 112 NN=1,1
        NROW = NROW + 1
      112      SUM = SUM + (A(NN)*A(NROW))
      113      A(NPP) = A(NPP) - SUM
      114      CONTINUE
        IF (KSUM .EQ. N) GO TO 116
C*** ***KSUM = N IF YOU HAVE READ ENTIRE LMATRIX AND
C*** ***THERE IS NO CONSTANT SECTION LEFT
      NTBEG = NBEG
      NTEND = NEND
      KSUMP1 = KSUM + 1
C*** ***READ REST OF LROWS 1 ROW AT A TIME FOR CONSTANT SECTION
260      DO 115 I=KSUMP1,N
        NTBEG = NTBEG + 1
      NTEND = NTEND + 1
      115      CONTINUE
        CALL GETROW (LTAPE, 1, MAXW, 1)
      MAXH = 2*MAXW
        CALL GETROW (LTAPE, 1, A, MAXH)
      JCNT = -1
C*** ***PARTIALLY REDUCE A RHS ACROSS A RHS ROW BY APPLYING K NUMBER
C*** ***OF L(I,J) S
275      DO 124 NPP = NTBEG, NTEND, N
        JCNT = JCNT + 1
        SUM = (0,0,0)
      NROW = KINIT + (JCNT * N)
      DO 123 NN = 1,K
        NROW = NROW + 1
      123      SUM = SUM + (A(NN) * A(NROW))
      124      A(NPP) = A(NPP) - SUM
      285
  
```

```

115 CONTINUE          QUAS      287
      NBEG = NBEG + 1   QUAS      288
      NEND = NEND + 1   QUAS      289
C***  ***KINIT IS HOW FAR DOWN A COLUMN OF RHS TO START MULTIPLYING BY
C***  ***L(I,J) AT EACH PASS THROUGH
      KINIT = KINIT + K  QUAS      290
C***  ***IF KSUMP1 = N THERE ARE NO MORE L(I,J)'S LEFT
      IF(KSUMP1 .LT. N) GO TO 111  QUAS      291
C***  ***WRITE OUT ALL BUT LAST K ROWS OF RHS IN ROW ORDER ON NATAPE
      116 B = 4*M + 3    QUAS      292
      C = -2 , KORE     QUAS      293
      K = ( B + SQRT( R**2 - 4.0*C ) )/2.0  QUAS      294
      IF(K .GT. ND) K = ND  QUAS      295
      KF = K             QUAS      296
      KM1 = K - 1        QUAS      297
      KLEFT = N - KF + IINIT  QUAS      298
      INITP1 = IINIT + 1   QUAS      299
      NEND = (M-1)*N + IINIT  QUAS      300
      DO 117 NPP = INITP1,KLEFT  QUAS      301
      NEND = NEND + 1        QUAS      302
      WRITE(NATAPE) ( A(J),J=NPP,NEND,N)  QUAS      303
      117 REWIND NATAPE  QUAS      304
C***  ***UPASS1 IS TRUE ON 1ST PASS THRU BACK SOLUTION
      C***  ***PUT REMAINING RHS IN CONTOGEOUS LOCATIONS BY COLUMNS
      C***  FROM KORE - (M * KF) + 1 TO KORE  QUAS      305
      C   NNEW = KORE - KF + 1  QUAS      306
      MM1 = M - 1            QUAS      307
      C***  ***IF M = 1, THE ELTS OF THE 1 RHS COLUMN ARE ALREADY IN CONTOGEOUS
      C***  LOCATIONS  QUAS      308
      C   IF (M.EQ.1) GO TO 111B  QUAS      309
      DO 118 I = 1,MM1  QUAS      310
      NOLD = KORE - (I*N) + 1  QUAS      311
      DO 118 J = 1,KF  QUAS      312
      NNEW = MNEW - 1        QUAS      313
      NOLD = MOLD - 1        QUAS      314
      A(NNEW) = A(NOLD)  QUAS      315
      118 CONTINUE  QUAS      315
      1118 CONTINUE  QUAS      316
      C***  ***NOW NNEW = KORE - (M*KF) + 1  QUAS      317
      C***  ***NOW NOLD = KORE - (M - 1) * N + 1 - KF  QUAS      318
      C***  SKIP 1ST PART OF TRAPEZOIDAL MATRIX + READ LAST K ROWS
      C***  ***ATTATCH RHS TO IT SO THAT EVERYTHING IS IN CONSECUTIVE ORDER  QUAS      319
      NREMAN = ND - K        QUAS      320
      IF (NREMAN .EQ. 0) GO TO 126  QUAS      321
      DO 122 I = 1,NREMAN  QUAS      322
      122 READ(MT) IDUMMY  QUAS      323
      126 NEND = 0          QUAS      324
      KCNT = K              QUAS      325
      NNEW = MNEW - 1        QUAS      326
      C***  ***NOTE THAT K = KF WHICH IS ALREADY KNOWN IN CORE
      DO 121 JCNT = 1,K  QUAS      327
      121 NNEW = MNEW - 1  QUAS      328
      C***  ***DO 121 JCNT = 1,K  QUAS      329
      121 NNEW = MNEW - 1  QUAS      330
      C***  ***DO 121 JCNT = 1,K  QUAS      331
      121 NNEW = MNEW - 1  QUAS      332
      C***  SKIP 1ST PART OF TRAPEZOIDAL MATRIX + READ LAST K ROWS
      C***  ***ATTATCH RHS TO IT SO THAT EVERYTHING IS IN CONSECUTIVE ORDER  QUAS      333
      NREMAN = ND - K        QUAS      334
      IF (NREMAN .EQ. 0) GO TO 126  QUAS      335
      DO 122 I = 1,NREMAN  QUAS      336
      122 READ(MT) IDUMMY  QUAS      337
      126 NEND = 0          QUAS      338
      KCNT = K              QUAS      339
      NNEW = MNEW - 1        QUAS      340
      C***  ***DO 121 JCNT = 1,K  QUAS      341
      121 NNEW = MNEW - 1  QUAS      342
      C***  ***DO 121 JCNT = 1,K  QUAS      343
      121 NNEW = MNEW - 1  QUAS      344

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```
NBEG = NEND + 1          QUAS 344
KCNT = KCNT - 1          QUAS 345
NEND = NBEG + KCNT      QUAS 346
READ(MT)IDUMMY,(A(J),J=NBEQ,NEND)
NNEW = NNEW + 1          QUAS 347
KEND = (MM1 * KF) + NNEW QUAS 348
DO 121 NPP=NNEW,KEND,KF   QUAS 349
NEND = NEND + 1          QUAS 350
121 A(NEND) = A(NPP)     QUAS 351
IFILES(LTAP) = NFILE    QUAS 352
CALL GEDLAB(8HQUAS Q2,LTAP,NAME,1,IRD,JCD) QUAS 353
REWIND MT                QUAS 354
C -- THERE, NOW WE CAN START THE BACK-SOLUTION
C -- NOTE.. THE FIRST AVAILABLE LOCATION FOR THE SOLUTIONS IS A(N1)
C ***NL IS THE LAST SUBSCRIPT + 1 OF THE TRAPEZOIDAL A MATRIX THAT
C ***CORE
C NL = NEND + 1          QUAS 355
C NREM = N                QUAS 356
C NPM = N + M             QUAS 357
C NEL = NPM               QUAS 358
C MP1 = M + 1              QUAS 359
C LAST = K.EQ. N           QUAS 360
C NPASS = 0                QUAS 361
C -- SOLVE FOR THE ANSWERS CORRESPONDING TO 'K' ROWS
C 119 KM1 = K - 1          QUAS 362
C KP1 = K + 1              QUAS 363
C NS = NL - MP1            QUAS 364
C NPASS = NPASS + 1         QUAS 365
C DO 130 MN = 1, M          QUAS 366
C NF = NS + MN             QUAS 367
C A(NF) = A(NF) / A(NS)     QUAS 368
C NT = NS                  QUAS 369
C IF (KM1.EQ. 0) GO TO 130 QUAS 370
C DO 125 IB = 1, KM1        QUAS 371
C NF = NF - IB - M          QUAS 372
C NT = NT - MP1 - IB        QUAS 373
C SUM = (0.0,0.0)            QUAS 374
C NP = NF                  QUAS 375
C N2 = MP1 + IB             QUAS 376
C DO 120 IO = 1, IB          QUAS 377
C NN = NT + IO              QUAS 378
C NP = NP + N2 - IO          QUAS 379
C 120 SUM = SUM + A(NN) * A(NP) QUAS 380
C 125 A(NF) = (A(NF) - SUM) / A(NT) QUAS 381
C 130 CONTINUE                QUAS 382
C -- MOVE THE SOLUTIONS TO CONSECUTIVE LOCATIONS STARTING AT A(N1)
C N1 = KORE + 1              QUAS 383
C DO 140 NN = 1, K           QUAS 384
C 140 CONTINUE                QUAS 385
C -- MOVE THE SOLUTIONS TO CONSECUTIVE LOCATIONS STARTING AT A(N1)
C N1 = KORE + 1              QUAS 386
C DO 140 NN = 1, K           QUAS 387
C 140 CONTINUE                QUAS 388
C -- MOVE THE SOLUTIONS TO CONSECUTIVE LOCATIONS STARTING AT A(N1)
C N1 = KORE + 1              QUAS 389
C DO 140 NN = 1, K           QUAS 390
C 140 CONTINUE                QUAS 391
C -- MOVE THE SOLUTIONS TO CONSECUTIVE LOCATIONS STARTING AT A(N1)
C N1 = KORE + 1              QUAS 392
C DO 140 NN = 1, K           QUAS 393
C 140 CONTINUE                QUAS 394
C -- MOVE THE SOLUTIONS TO CONSECUTIVE LOCATIONS STARTING AT A(N1)
C N1 = KORE + 1              QUAS 395
C DO 140 NN = 1, K           QUAS 396
C 140 CONTINUE                QUAS 397
C -- MOVE THE SOLUTIONS TO CONSECUTIVE LOCATIONS STARTING AT A(N1)
C N1 = KORE + 1              QUAS 398
C DO 140 NN = 1, K           QUAS 399
C 140 CONTINUE                QUAS 400
```

```

400      NL = NL - 1          QUAS 401
        N1 = N1 - 1          QUAS 402
        135 A(N1) = A(NL)    QUAS 403
        140 NL = NL - NN     QUAS 404
C - - WRITE THE SOLUTIONS ON TAPE
C
        WRITE (NIN) K          QUAS 405
        NS = N1 - 1           QUAS 406
        DO 145 MN = 1, M     QUAS 407
        NT = NS + MN
145      WRITE ( NIN ) ( A(I0), IO = NT, KORE, M )
C - - TEST IF THIS IS THE LAST PASS
C
        IF (LAST) GO TO 200
C - - WE MUST NOW MODIFY THE TRIANGULAR MATRIX TO REFLECT THE EFFECT OF
C - - THE SOLUTIONS OBTAINED SO FAR (EQ 21)
C * * NOTE - LOCATIONS A(1) TO A(N1-1) ARE NOW FREE TO USE
C
        C - - CALCULATE THE NEXT VALUES OF 'NEL' AND 'NREM'
C
        NELOLD = NEL
        KOLD = K
        NEL = NEL - K
        NREM = NREM - K
C
        NROW = NREM - K + 1
        IF (K .LT. NREM) GO TO 150
        LAST = .TRUE.
        NROW = 1
        K = NREM
150      NS = 1
        NT = NELOLD + 1
C - - READ IN THE ROWS TO BE MODIFIED
C
        DO 190 1B = 1, NREM
        NT = NT - 1
        IF (1B .LE. NROW) GO TO 160
        NS = NS + NN
        NT = NT + NN
        160 IF (.NOT. JPASS1) GO TO 161
        NBEG = NT - M + 1
C ***READ RHS FROM NATAPE
        READ (NATAPE) ( A(I0), IO = NBEG, NT )
        NT = NT - M
        161 READ(MT)NN,(A(I0),IO=NS,NT)
        IF (.NOT. JPASS1) GO TO 163
        NT = NT + M
        NN = NN + M
163      NP = N1 - 1
        NF = NT - M - KM1
        NN = NN - KOLD
        DO 170 MN = 1, M
        N? = NF

```

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        NA = NP + MN
        NB = NA
        SUM = (O,O,O,O)
  460   DO 165 IO = 1, KOLD
        SUM = SUM + A(N2) *
        N2 = N2 + 1
  165   NA = NA + M
        N2 = N2 + MN - 1
  170   A(N2) = A(N2) - SUM
        C   C -- WRITE THE MODIFIED
        C   C
        NL = NT - M + 1
        IF (IB .GE. NROW) G
        NF = NL - KP1
        WRITE (NOUT) NN, (A
        GO TO 190
  175   NF = NL - KOLD
        DO 180 MN = NL, NT
        A(NF) = A(MN)
  180   NF = NF + 1
        190 CONTINUE
C*** ****IF 1ST TIME THRU
C*** ****ORIGINAL TRAPEZOIDAL
C*** ****TAPE PART IN ALTE
C*** ****AND THIS NOW DOES
        IF (.NOT. UPASS1 )
        NTEMP = MT
        MT = NATAPE
        NATAPE = NTEMP
        UPASS1=.FALSE.
        REWIND NATAPE
  195   REWIND MT
        REWIND NOUT
        C   C -- SWITCH THE TAPES
        C   C
        NT = MT
        MT = NOUT
        NOUT = NT
        C   C -- LOOP BACK THRU THE
        C   C
        NL = NF
        GO TO 119
        C   C -- START TO WRAP IT UP
        C   C
        200 REWIND NIN
        N2 = N
        C   C * NOTE.. AT THIS POIN
        C   C
  495   DO 220 IB = 1, NPAS
        READ (NIN) K
        N1 = N2 - K + 1
        NS = N1
  500
  505
  510

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		9
PAGE		
E ROW		
. IO = NL, NT)		
THAT MT WHICH HAS THE TAPE AND IS NOT TO NATAPE BECOMES MT		
QUAS	458	
QUAS	459	
QUAS	460	
QUAS	461	
QUAS	462	
QUAS	463	
QUAS	464	
QUAS	465	
QUAS	466	
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QUAS	512	
QUAS	513	
QUAS	514	

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```

515      C NT = N2
      C -- READ IN THE SOLUTIONS
      DO 210 IO = 1, M
        READ (NIN) (A(NN), NN = NS, NT)
        NT = NT + N
      210 NS = NS + N
      220 N2 = N1 - 1
      C --- REWIND ALL INPUT TAPES
        REWIND NIN
        REWIND MT
        REWIND NOUT
      C -- WRITE THE SOLUTIONS ON TAPE
        C
        NT = 0
        DO 230 IO = 1, M
          NS = NT + 1
          NT = NT + N
          IF (NPR1.EQ.0) GO TO 230
          WRITE (ITAPEW,3) IO
          WRITE (ITAPEW,2) (A(NN), NN = NS, NT)
        230 WRITE (NW) (A(NN), NN = NS, NT)
        C *** IF TAPE WAS NEVER SWITCHED IT WOULD BE FOOLISH TO SWITCH BACK
          IF (JPASS1) GO TO 290
        C
        C*** ***SWITCH TAPES
        C*** ***BACK SO THAT MT WILL CONAIN THE TRAPEZOIDAL MATRIX
        C*** ***NATAPE WILL HAVE NOTHING USEFUL ON IT.
        NTEMP = NATAPE
        NATAPE = MT
        MT = NTEMP
        REWIND NATAPE
      290 IF (.NOT. LASTRS) GO TO 109
      295 CONTINUE
      C READ THE TEMPORARY UNIT FOR AIC'S. STORE ON THE PERMANENT UNIT.
      C AND ADD THE ADDITIONAL INFORMATION
      C
      CALL GEDLAB (8HQUAS O3,LTAPE,NAME,1,IRD,JCD)
      C
      555      REWIND MT
      KRED = 0
      C
      DO 450 I=1,NLCNT
        CALL GETROW (LTAPE, 1, KREAD, 1)
        CALL PUTROW (LTAPES, 2, KREAD, 1)
        KRED = KRED + KREAD
      450 LREAD=1,KREAD
        CALL GETROW (LTAPE, 1, MAXW, 1)
        CALL PUTROW (LTAPES, 2, MAXW, 1)
        MAXH = 2*MAXW
        CALL GETROW (LTAPE, 1, DUMMY, MAXH)
        CALL PUTROW (LTAPES, 2, DUMMY, MAXH)
      450 CONTINUE
      C
      560      DO 450 I=1,NLCNT
        CALL GETROW (LTAPE, 1, KREAD, 1)
        CALL PUTROW (LTAPES, 2, KREAD, 1)
        KRED = KRED + (N-KRED-1)
      450 LREAD=1,KREAD
        CALL GETROW (LTAPE, 1, MAXW, 1)
        CALL PUTROW (LTAPES, 2, MAXW, 1)
        MAXH = 2*MAXW
        CALL GETROW (LTAPE, 1, DUMMY, MAXH)
        CALL PUTROW (LTAPES, 2, DUMMY, MAXH)
      450 CONTINUE
      C
      570      C
      571      C
  
```



SUBROUTINE QUAS	74/74	OPT=1	RELOCATION		FTN 4.8+577	85/01/23.	08.10.44	PAGE
VARIABLES	SN	TYPE						12
2171	INITP1	INTEGER						
2130	ID	INTEGER						
O	IOS	INTEGER						
2146	IRD	INTEGER						
2077	IRDU	INTEGER						
0	ITAPES	INTEGER						
2103	ITAPEW	INTEGER						
2101	TUMEMF	INTEGER						
2155	J	INTEGER						
2147	JCD	INTEGER						
2100	JCDU	INTEGER						
2161	JCNT	INTEGER						
2074	JPASS1	LOGICAL						
2121	K	INTEGER						
2177	KCNT	INTEGER						
O	KD	INTEGER						
2200	KEND	INTEGER						
2167	KF	INTEGER						
O	KFILES	INTEGER						
2151	KINIT	INTEGER						
2170	KLEFT	INTEGER						
2140	KM1	INTEGER						
2207	KOLD	INTEGER						
2105	KORE	INTEGER						
2204	KP1	INTEGER						
2213	KREAD	INTEGER						
2212	KRED	INTEGER						
2157	KSUM	INTEGER						
2166	KSUMP1	INTEGER						
2124	KTEMP	INTEGER						
2076	LAST	LOGICAL						
2075	LASTRS	LOGICAL						
2137	LBEG	INTEGER						
2141	LEND	INTEGER						
2214	LREAD	* INTEGER						
O	LTAPE	INTEGER						
2120	LTAPES	INTEGER						

VARIABLES	SN	TYPE	74/74	OPT=1	RELOCATION	REFS	REFS	FTN 4.8+577	85/01/23.	08.10.44	PAGE	
204	DEFINED					304	302	300	390	411	446	12
535	DEFINED					389	389	118	118	144	448	
446	DEFINED					448	448	460	460	518	555	
446	REFS					448	448	21	21	2472	2472	
REFS	REFS					204	204	25	25	35	35	
REFS	REFS					353	353	554	554	554	554	
REFS	REFS					72	72	33	33	33	33	
REFS	REFS					18	18	23	23	41	41	
REFS	REFS					41	41	1/O REF'S	1/O REF'S	535	536	
REFS	REFS					71	71	DEFINED	DEFINED	35	35	
REFS	REFS					306	306	204	204	221	221	
REFS	REFS					253	253	353	353	306	323	
REFS	REFS					279	279	342	342	306	323	
REFS	REFS					275	275	449	449	483	539	
REFS	REFS					27	27	487	487	105	114	
REFS	REFS					80	80	86	86	105	118	
REFS	REFS					130	130	144	162	193	232	
REFS	REFS					282	282	291	298	300	334	
REFS	REFS					368	368	373	374	398	407	
REFS	REFS					428	428	512	512	82	90	
REFS	REFS					298	298	432	432	511	511	
REFS	REFS					344	344	345	345	339	344	
REFS	REFS					45	45	DEFINED	DEFINED	1	1	
REFS	REFS					349	349	301	301	323	349	
REFS	REFS					301	301	314	314	323	349	
REFS	REFS					24	24	219	219	226	227	
REFS	REFS					291	291	291	291	226	255	
REFS	REFS					299	299	217	217	227	255	
REFS	REFS					304	304	131	131	381	453	
REFS	REFS					218	218	240	240	300	373	
REFS	REFS					291	291	130	130	460	474	
REFS	REFS					299	299	454	454	55	76	
REFS	REFS					180	180	52	52	217	296	
REFS	REFS					202	202	202	202	314	322	
REFS	REFS					45	45	471	471	561	562	
REFS	REFS					559	559	560	560	374	563	
REFS	REFS					562	562	562	562	562	563	
REFS	REFS					561	561	236	236	266	266	
REFS	REFS					563	563	133	133	132	228	
REFS	REFS					564	564	293	293	DEFINED	DEFINED	
REFS	REFS					86	86	90	90	85	156	
REFS	REFS					29	29	81	81	415	397	
REFS	REFS					368	368	72	72	80	91	
REFS	REFS					430	430	214	214	548	563	
REFS	REFS					28	28	133	133	137	137	
REFS	REFS					132	132	132	132	DEFINED	DEFINED	
REFS	REFS					578	578	554	554	567	71	
REFS	REFS					560	560	565	565	574	578	
REFS	REFS					70	70	70	70	70	70	

	SUBROUTINE QUAS		74/74	OPT = 1
VARIABLES	SN	TYPE	RELOCATION	
2107 M		INTEGER		
2143 MAXH		INTEGER		
2142 MAXW		INTEGER		
	O	MD	INTEGER	F.P.
	O	MM	INTEGER	F.P.
2110 MMAX		INTEGER		
2173 MM1		INTEGER		
2134 MN		INTEGER		
	2144 MNM1	INTEGER		
2115 MP1		INTEGER		
2106 MRHS		INTEGER		
2112 MT		INTEGER		
2150 NTOTAL		INTEGER		
2104 N		INTEGER		
	2210 NA	INTEGER	ARRAY	
221720 NAME		INTEGER	ARRAY	
221716 NAMES		INTEGER		
221716 O		INTEGER		
2102 NATAPE		INTEGER		
2135 NB		INTEGER		
2153 NBEG		INTEGER		
	O	ND	INTEGER	F.P.
2117 NEL		INTEGER		
2206 NELOLD		INTEGER		
2131 NELP1		INTEGER		
2132 NELP2		INTEGER		
2154 NEND		INTEGER		
2136 NF		INTEGER		
	O	NFILE	INTEGER	F.P.
	O	NI	INTEGER	F.P.

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53	55	64	150
213	215	217	194
320	365	367	227
444	447	450	377
518	531	DEFINED	451
136	179	248	52
135	178	247	274
134	135	177	273
564	565	566	567
133	176	573	566
1	587	58	575
54	DEFINED	1	575
321	348	83	84
124	2*126	DEFINED	208
410	457	164	210
169	377	464	215
176	DEFINED	399	216
375	384	175	217
53	212	387	218
484	494	214	219
489	526	454	220
211	212	455	221
207	211	54	222
52	54	55	223
227	252	55	224
301	303	255	225
520	521	306	226
458	461	533	322
20	204	463	562
20	72	353	564
37	DEFINED	DEFINED	554
485	544	1	554
38	306	1/0	REFS
125	126	307	31
167	458	446	31
222	241	167	31
DEFINED	219	168	31
44	2*298	223	31
2*76	98	226	31
151	193	252	31
66	193	223	31
434	DEFINED	223	31
110	116	129	31
101	DEFINED	110	31
115	DEFINED	223	31
222	223	224	31
306	343	346	31
220	224	227	31
345	350	227	31
166	169	2*379	383
476	477	500	477
453	471	474	477
203	352	DEFINED	1
60	1	1/0	REFS

SUBROUTINE QUAS			74/74	OPT=1	FTN 4.8+577	85/01/23.	08.10.44	PAGE
VARIABLES	SN	TYPE	RELOCATION			85/01/23.	08.10.44	
2113	NIN	INTEGER						
2201	NL	INTEGER						
2160	NLCNT	INTEGER						
2116	NN	INTEGER						
2172	NNEW	INTEGER						
0	NO	INTEGER						
2174	NOLD	INTEGER						
2114	NOUT	INTEGER						
2133	NP	INTEGER						
2203	NPASS	INTEGER						
2111	NPM	INTEGER						
2162	NPP	INTEGER						
0	NPR1	INTEGER						
2202	NREM	INTEGER						
2175	NREMAN	INTEGER						
2163	NRROW	INTEGER						
2127	NS	INTEGER						
2125	NT	INTEGER						
2164	NTBEG	INTEGER						
2211	NTTEMP	INTEGER						
2165	NTEND	INTEGER						
0	NW	INTEGER						
2145	N1	INTEGER						
2205	N2	INTEGER						
0	RHSTAP	INTEGER						
2072	SUM	COMPLEX						

VARIABLES USED AS FILE NAMES. SEE ABOVE

SUBROUTINE	QUAS	74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE	15
EXTERNALS							
GEDLAB							
GETROW	TYPE	6	REFARGES	353	554	564	567
PUDLAB		4	204	246	272	274	567
PUTROW		6	232	72	136	177	568
		4	128	134	179	560	574
SQRT	REAL	1	LIBRARY	576	297		
				85			
INLINE FUNCTIONS							
MAXO	FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES		
MINO		INTEGER	O INTRIN	55	53		
		INTEGER	O INTRIN				
STATEMENT LABELS							
0	1	INACTIVE	DEF LINE	36	REFERENCES		
2054	2	FMT	593	536			
2057	3	FMT	594	535			
25	5		50	47			
31	6		52	49			
71	10		76	195			
115	30		95	81	86		
0	40		100	96			
0	50		126	114	118	123	
0	55		137	131			
234	56		141	105			
0	60		148	144			
0	65		168	166			
0	70		170	162			
0	80		181	155			
373	90	INACTIVE	199	149			
0	105		202				
414	109		211	548			
0	110		224	221			
412	111		231	293			
0	112		258	256			
0	113		259	252			
0	114		260	240			
0	115		286	268			
617	116		295	261			
0	117		306	304			
0	118		327	321	323		
1005	119		373	501			
0	120		391	388			
0	121		351	342	349		
0	122		337	336			
0	123		284	282			
0	124		285	278			
0	125		392	382			
725	126		338	335			
1075	130		393	377	381		
0	135		402	399			
0	140		403	398			
0	145		411	409			
1161	150		433	429			
1172	160		443	440			
1205	161		448	443			
1220	163		452	449			
0	165		463	460			

STATEMENT LABELS	DEF LINE	REFERENCES					
LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS	REFS
0 170	465	455					
1307 175	474	470					
0 180	477	475					
1323 190	478	438					
1334 195	489	483					
1345 200	505	415					
0 210	521	518					
0 220	522	510					
1426 230	537	531					
1445 290	548	539					
1446 295	549	209					
0 450	569	558					
0 500	577	571					
0 1114	245						
0 1115	271						
714 1118	328	320					
0 9999	328						
0 9999	588						
117 40	IB	96 100	14B				
140 50	IB	114 126	46B			NOT INNER	
145 50	IO	118 126	36B			NOT INNER	
167 50	NF	123 126	11B	OPT			
214 55	IB	131 137	20B		EXT REFS		
240 60	IO	144 148	15B		EXT REFS		
263 80	IO	155 181	77B		EXT REFS		
275 70	IB	162 170	37B		NOT INNER		
316 65	NN	166 168	10B	OPT			
430 110	J	221 224	15B		EXT REFS		
462 114	I	240 260	50B		EXT REFS		
475 113	NPP	252 259	32B		NOT INNER		
507 112	NN	256 258	10B	OPT			
540 115	I	268 286	50B		EXT REFS		
553 124	NPP	278 285	32B		NOT INNER		
565 123	NN	282 284	10B	OPT			
643 117	NPP	304 306	20B		EXT REFS		
650 112	J	306 306	7B		EXT REFS		
672 118	I	321 327	22B		NOT INNER		
703 118	J	323 327	6B	INSTACK			
720 122	I	336 337	5B		EXT REFS		
732 121	JCNT	342 351	33B		EXT REFS		
755 121	NPP	349 351	5E		INSTACK		
1013 130	MN	377 393	65B		NOT INNER		
1027 125	IB	382 392	46B	OPT			
1043 120	IO	388 391	14B		NOT INNER		
1102 140	NN	398 403	20B				
1110 135	MN	399 402	6B	INSTACK			
1127 145	MN	409 411	21B		EXT REFS		
1135 10	IO	411 411	7B		EXT REFS		
1164 190	IB	438 478	142B		EXT REFS		
1227 170	MN	455 465	40B		EXT REFS		
1243 165	IO	460 463	12B	OPT	NOT INNER		
1316 180	MN	475 477	4B	INSTACK			
1352 220	IB	510 522	30B		EXT REFS		
1361 210	IO	518 521	14B		EXT REFS		
1411 230	IO	531 537	27B		EXT REFS		
1455 450	I	553 569	31B		EXT REFS		

AD-A152 278

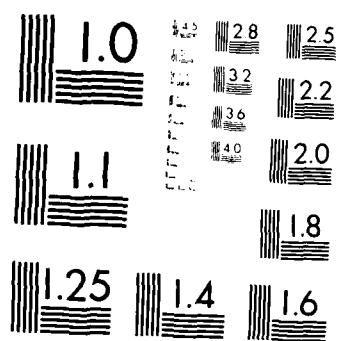
ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER  
PROGRAM FOR DETERMINING. (U) GRUMMAN AEROSPACE CORP  
BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-1  
UNCLASSIFIED N00019-81-C-0395

8/8

F/G 9/2

NL

END  
FILED  
OIC



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS

PAGE 17

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FTN 4.8+577

SUBROUTINE QUAS

74/74

OPT=1

INDEX

FROM-TO

LENGTH

PROPERTIES

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
1466	450	LREAD	563 569	16B	EXT REFS
1507	500	NROW	571 577	20B	EXT REFS

COMMON BLOCKS

LENGTH

MEMBERS - BIAS NAME(LENGTH)

CTAPES	50	O ITAPES (50)
CFILES	51	O KFILES (1)
PLACES	98	O IOS (98)

STATISTICS

PROGRAM LENGTH

21750B

9192

CM LABELED COMMON LENGTH

307B

199

52000B CM USED



SUBROUTINE FUTSOL    74/74    OPT=1

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```
MT = MM
REWIND MT
NIN = NI
REWIND NIN
NOUT = NO
REWIND NOUT
NN = N
NEL = NPM

C -- - CALCULATE THE MAXIMUM NO. OF ROWS, 'K'
C *** CALCULATE THE NUMBER OF COLUMNS TO BRING OFF OF THE RHS TAPE
MTOTAL = 0

10 M = MMAX
IF(M .EQ. 0)GO TO 295
C *** ***MTOTAL IS THE TOTAL NUMBER OF RHS COLUMNS ALREADY BROUGHT IN
109 MTOTAL = MTOTAL + M
LASTR = MTOTAL.GE. MRHS
MTOTAL = MTOTAL - M
IF ((LASTR)M = MRHS - MTOTAL
MP1 = M + 1
MM1 = M - 1
MTOTAL = MTOTAL + M
DO 110 J=1,M
READ (RHTAP)( A(I),I=NBEG,NEND)
INIT = KINIT - (M+N)
NBEG = KINIT + 1
NEND = KINIT+ N
DO 110 J=1,M
READ (RHTAP)( A(I),I=NBEG,NEND)
NBEG = NEND + 1
110 NEND = NEND + N
C *** ***BRING IN L(I,J) MATRIX AND APPLY IT TO RHS
NBEG = 1 + KINIT
NEND = 1 + (M-1) * N + KINIT
KSUM = 0
NLCT = 0
C *** ***DO TRIANGULAR SECTION OF LMATRIX
111 CONTINUE
CALL GETROW (LTAPE,1,K,1)
C *** ***NOTE THAT KM1 CAN'T BE 0 SINCE K CAN'T BE 1 AND STILL HAVE SOM
C *** ***ON THE LTape
100 NLCT = NLCT + 1
C *** ***KSUM IS THE TOTAL NUMBER OF L ROWS THAT WILL
C *** ***BE READ AFTER THIS TRIANGULAR SECTION IS FINISHED
KSUM = KSUM + K
KM1 = K - 1
C *** ***NOTE THAT KM1 CAN'T BE 0 SINCE K CAN'T BE 1 AND STILL HAVE SOM
C *** ***ON THE LTape
105 DO 114 I = 1,KM1
NBEG = NBEG + 1
NEND = NEND + 1
DO 114 I = 1,KM1
NBEG = NBEG + 1
NEND = NEND + 1
C *** ***READ 1 ROW OF L(I,J) FROM LTape---K-1 TIMES---EACH TIME
C *** ***STARTING WITH L(1)
110 CALL GETROW (LTAPE,1,MAXW,1)
MAXW = 2*MAXW
CALL GETROW (LTAPE,1,A,MAXH)
JCNT = -1
C *** ***REFINE THE ONE BY ONE ACROSS A SOLUTION ROW WHICH
```

SUBROUTINE FUTSOL 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 3  
 115 C\*\*\* \*\*\*ARE NOT IN CONSECUTIVE ORDER, BUT A(1), A(N+1), A(2N+1) ETC.) FUTSOL 116  
 DO 113 NPP = NBEG,NEND,N  
 JCNT = JCNT + 1  
 SUM = (0.0,0.0)  
 NROW = KINIT + (JCNT \* N )  
 DO 112 NN=1,I  
 NROW = NROW + 1  
 112 SUM = SUM + ( A(NN)\*A(NROW))  
 113 A(NPP) = A(NPP) - SUM  
 114 CONTINUE  
 IF (KSUM EQ. NIGO TO 116  
 C\*\*\* \*\*\*KSUM = N IF YOU HAVE READ ENTIRE LMATRIX AND  
 C\*\*\* \*\*\*THERE IS NO CONSTANT SECTION LEFT  
 NTBEG = NBEG  
 NTEND = NEND  
 KSUMP1 = KSUM + 1  
 130 C\*\*\* \*\*\*READ REST OF LROWS 1 ROW AT A TIME FOR CONSTANT SECTION  
 DO 115 I=KSUMP1,N  
 NTBEG = NTBEG + 1  
 NTEND = NTEND + 1  
 CALL GETROW (LTAPE,1,MAXW,1)  
 MAXH = 2\*MAXW  
 CALL GETROW (LTAPE,1,A,MAXH)  
 JCNT = -1  
 135 C\*\*\* \*\*\*PARTIALLY REDUCE A RHS ACROSS A RHS ROW BY APPLYING K NUMBER  
 C\*\*\* \*\*\*OF L(I,J) S  
 DO 124 NPP = NTBEG,NTEND,N  
 JCNT = JCNT + 1  
 SUM = (0.0,0.0)  
 NROW = KINIT + (JCNT \* N )  
 DO 123 NN = 1,K  
 NROW = NROW + 1  
 123 SUM = SUM + ( A(NN) \* A(NROW) )  
 124 A(NPP) = A(NPP) - SUM  
 115 CONTINUE  
 NBEG = NBEG + 1  
 NEND = NEND + 1  
 C\*\*\* \*\*\*KINIT IS HOW FAR DOWN A COLUMN OF RHS TO START MULTIPLYING BY  
 C\*\*\* \*\*\*L(I,J) AT EACH PASS THROUGH  
 KINIT = KINIT + K  
 C\*\*\* \*\*\*IF KSUMP1 = N THERE ARE NO MORE L(I,J)'S LEFT  
 IF(KSUMP1 .LT. N)GO TO 111  
 C\*\*\* \*\*\*WRITE OUT ALL BUT LAST K ROWS OF RHS IN ROW ORDER ON NATAPE  
 116 B = 4\*M + 3  
 150 C = -2 \* KORE  
 K = ( -B + SQRT( B\*\*2 - 4.0\*C ) )/2.0  
 IF(K .GT. ND) K = ND  
 KF = K  
 KM1 = K - 1  
 KLEFT = N - KF + IINIT  
 INITP1 = IINIT + 1  
 NEND = (M-1)\*N + IINIT  
 DO 117 NPP = INITP1,KLEFT  
 NEND = NEND + 1  
 117 WRITE(NATAPE) ( A(J),J=NPP,NEND,N )  
 REWIND NATAPE  
 C\*\*\* \*\*\*JPASS1 IS TRUE ON 1ST PASS THRU BACK SOLUTION  
 160 FUTSOL 161  
 165 FUTSOL 166  
 170 FUTSOL 171  
 FUTSOL 172

SUBROUTINE FUTSOL 74/74 OPT=1

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```
C JPASS1 = .TRUE.  
C*** PUT REMAINING RHS IN CONTIGUOUS LOCATIONS BY COLUMNS  
C*** FROM KORE - (M * KF) + 1 TO KORE  
C NNEW = KORE - KF + 1  
C*** ***IF M = 1. THE ELTS OF THE 1 RHS COLUMN ARE ALREADY IN CONTIGUO  
C*** LOCATIONS  
C IF (M.EQ.1) GO TO 1118  
DO 1118 I = 1, MM1  
NOLD = KORE - (I*N) + 1  
DO 1118 J = 1,KF  
NNEW = NNEW - 1  
NOLD = NOLD - 1  
A(NNEW) = A(NOLD)  
1118 CONTINUE  
1118 CONTINUE  
C*** ***NOW NNEW = KORE - (M*KF) + 1  
C*** ***NOW NOLD = KORE - (M - 1) * N + 1 - KF  
C *** SKIP 1ST PART OF TRAPEZOIDAL MATRIX ON LTAPE  
C *** READ IN LAST K ROWS OF TRAPEZOIDAL MATRIX AND  
C*** ***ATTACH RHS TO IT SO THAT EVERYTHING IS IN CONSECUTIVE ORDER  
NREMAN = ND - K  
IF( NREMAN .EQ. 0 )GO TO 126  
DO 122 I=1,NREMAN  
CALL GETROW (LTAPE, 1,MAXW, 1)  
MAXH = 2*MAXW  
CALL GETROW (LTAPE, 1,DUMMY, MAXH)  
122 CONTINUE  
126 NEND = 0  
KCNT = K  
NNEW = NNEW - 1  
C*** NOTE THAT K = KF WHICH IS ALREADY KNOWN IN CORE  
DO 121 JCNT = 1,K  
NBEG = NEND + 1  
KCNT = KCNT - 1  
NEND = NBEG + KCNT  
CALL GETROW (LTAPE, 1,MAXW, 1)  
MAXH = 2*MAXW  
CALL GETROW (LTAPE, 1,A(NBEG), MAXH)  
NNEW = NNEW + 1  
KEND = (MM1 - KF) + NNEW  
DO 121 NPP=NNEW,KEND,KF  
NEND = NEND + 1  
121 A(NEND) = A(NPP)  
ITFILES(LTape) = LFILE  
CALL GEDLAB (8HFUTSOL1,LTAPE,NAME,LFILE,IRD,JCD)  
C *** SKIP OVER L MATRIX ON LTape TO GET TO TRAPEZOIDAL MATRIX  
C KRED = 0  
DO 128 I=1,NLCNT  
CALL GETROW (LTape, 1,KREAD, 1)  
KRED = KRED + KREAD  
225
```

```
FUTSOL 173  
FUTSOL 174  
FUTSOL 175  
FUTSOL 176  
FUTSOL 177  
FUTSOL 178  
FUTSOL 179  
FUTSOL 180  
FUTSOL 181  
FUTSOL 182  
FUTSOL 183  
FUTSOL 184  
FUTSOL 185  
FUTSOL 186  
FUTSOL 187  
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FUTSOL 216  
FUTSOL 217  
FUTSOL 218  
FUTSOL 219  
FUTSOL 220  
FUTSOL 221  
FUTSOL 222  
FUTSOL 223  
FUTSOL 224  
FUTSOL 225  
FUTSOL 226  
FUTSOL 227  
FUTSOL 228  
FUTSOL 229
```

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SUBROUTINE FUTSOL 74/74  OPT=1          FTN 4.8+577  85/01/23. 08.10.44 PAGE 5

230      KREAD = KREAD + ( N - KRED - 1 )
DO 128 LREAD = 1,KREAD
CALL GETROW (LTAPE,1,MAXW,1)
MAXH = 2*MAXW
CALL GETROW (LTAPE,1,DUMMY,MAXH)
128 CONTINUE

235      C - - THERE. NOW WE CAN START THE BACK-SOLUTION
C * * NOTE..THE FIRST AVAILABLE LOCATION FOR THE SOLUTIONS IS A(N1)
C
C*** NL IS THE LAST SUBSCRIPT + 1 OF THE TRAPEZOIDAL A MATRIX THAT
C*** CORE
C
240      NL = NEND + 1
NREM = N
NPM = N + M
NEL = NPM
MP1 = M + 1
LAST = K.EQ. N
NPASS = 0
C - - SOLVE FOR THE ANSWERS CORRESPONDING TO 'K' ROWS
C
245      119 KM1 = K - 1
KP1 = K + 1
NS = NL - MP1
NPASS = NPASS + 1
DO 130 MN = 1, M
NF = NS + MN
A(NF) = A(NF) / A(NS)
NT = NS
IF (KM1 .EQ. 0) GO TO 130
DO 125 IB = 1, KM1
NF = NF - IB - M
NT = NT - MP1 - IB
SUM = (0.0,0.0)
NP = NF
N2 = MP1 + IB
DO 120 IO = 1, IB
NN = NT + IO
NP = NP + N2 - IO
SUM = SUM + A(NN) * A(NP)
125 A(NF) = (A(NF) - SUM) / A(NT)
130 CONTINUE
C - - MOVE THE SOLUTIONS TO CONSECUTIVE LOCATIONS STARTING AT A(N1)
C
250      N1 = KORE + 1
DO 140 NN = 1, K
DO 135 MN = 1, M
NL = NL - 1
N1 = N1 - 1
135 A(N1) = A(NL)
140 NL = NL - NN
C
255      FUTSOL 230
FUTSOL 231
FUTSOL 232
FUTSOL 233
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FUTSOL 280
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FUTSOL 282
FUTSOL 283
FUTSOL 284
FUTSOL 285

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C      WRITE (NIN) K
      NS = N1 - 1
      DO 145 MN = 1, M
      NT = NS + MN
  290    145 WRITE ( NIN ) ( A(I0), I0 = NT, KORE, M)
C - - TEST IF THIS IS THE LAST PASS
C      IF (LAST) GO TO 200
C      IF (LAST) GO TO 200
C      C -- WE MUST NOW MODIFY THE TRIANGULAR MATRIX TO REFLECT THE EFFECT OF
C      C -- THE SOLUTIONS OBTAINED SO FAR (EQ 21)
C      C * * LOCATIONS A(1) TO A(N1-1) ARE NOW FREE TO USE
C      C -- CALCULATE THE NEXT VALUES OF 'NEL' AND 'NREM'
C      C      NELOLD = NEL
C      C      KOLD = K
C      C      NEL = NEL - K
C      C      NREM = NREM - K
  305    C      NROW = NREM - K + 1
          IF (K .LT. NREM) GO TO 150
          LAST = .TRUE.
          NROW = 1
          K = NREM
  310    150 NS = 1
          NT = NELOLD + 1
  315    C      C -- READ IN THE ROWS TO BE MODIFIED
C      C      DO 190 IB = 1, NREM
C      C      NT = NT - 1
C      C      IF (IB .LE. NROW) GO TO 160
C      C      NS = NS + NN
C      C      NT = NT + NN
C      C      160 IF (.NOT. UPASS1) GO TO 161
C      C      NBEG = NT - M + 1
C      C*** ***READ RHS FROM NATAPE
C      C      READ (NATAPE) ( A(I0), I0 = NBEG, NT )
C      C      NT = NT - M
C      C      CALL GETROW (LTAPE, 1, MAXW, 1)
C      C      NN = MAXW
C      C      MAXH = 2*MAXW
C      C      CALL GETROW (LTAPE, 1, A(NS), MAXH)
C      C      NT = NT + M
C      C      NN = NN + M
C      C      GO TO 163
C      C      161 READ (MT) NN, (A(I0), I0=NS, NT)
C      C      163 NP = N1 - 1
C      C      NF = NT - M - KM1
C      C      NN = NN - KOLD
C      C      DO 170 MN = 1, M
C      C      N2 = NF
C      C      NA = NP + MN
C      C      NB = NA
C      C      FUTSOL 287
C      C      FUTSOL 288
C      C      FUTSOL 289
C      C      FUTSOL 290
C      C      FUTSOL 291
C      C      FUTSOL 292
C      C      FUTSOL 293
C      C      FUTSOL 294
C      C      FUTSOL 295
C      C      FUTSOL 296
C      C      FUTSOL 297
C      C      FUTSOL 298
C      C      FUTSOL 299
C      C      FUTSOL 300
C      C      FUTSOL 301
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C      C      FUTSOL 303
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C      C      FUTSOL 339
C      C      FUTSOL 340
C      C      FUTSOL 341
C      C      FUTSOL 342
C      C      FUTSOL 343

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SUM = (0.0,0.0)
DO 165 IO = 1, KOLD
  SUM = SUM + A(N2) * A(NA)
  N2 = N2 + 1
165  NA = NA + M
  N2 = N2 + MN - 1
  170 A(N2) = A(N2) - SUM
C   C -- WRITE THE MODIFIED ROW ON TAPE OR CONDENSE THE ROW
C   NL = NT - M + 1
  IF (IB .GE. NROW) GO TO 175
  NF = NL - KP1
  WRITE (NOUT) NN, (A(10), IO = NS, NF), (A(10), IO = NL, NT)
  GO TO 190
175 NF = NL - KOLD
  DO 180 MN = NL, NT
    A(NF) = A(MN)
180 NF = NF + 1
190 CONTINUE
  IF( .NOT. JPASS1 ) GO TO 195
    JPASS1= .FALSE.
    REWIND NATAPE
195 REWIND MT
    REWIND NOUT
C   C -- SWITCH THE TAPES
370  C   NT = MT
      MT = NOUT
      NOUT = NT
C   C -- LOOP BACK THRU THE SOLUTION
C   NL = NF
375  C   GO TO 119
C   C -- START TO WRAP IT UP
C   200 REWIND NIN
      N2 = N
C   C * * NOTE.. AT THIS POINT ALL LOCATIONS A(1) THRU A(KORRE) ARE FREE
385  C   DO 220 IB = 1, NPASS
      READ (NIN) K
      N1 = N2 - K + 1
      NS = N1
      NT = N2
C   C -- READ IN THE SOLUTIONS
C   210 IO = 1, M
      READ (NIN) (A(NN), NN = NS, NT)
      NT = NT + N
      210 NS = NS + N
      220 N2 = N1 - 1
C   FUTSOL 344
      FUTSOL 345
      FUTSOL 346
      FUTSOL 347
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      FUTSOL 397
      FUTSOL 398
      FUTSOL 399
      FUTSOL 400

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SUBROUTINE FUTSOL 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 8

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400      C      C      -- REWIND ALL INPUT TAPES
        C      C      REWIND NIN
        C      C      REWIND MT
        C      C      REWIND NOUT
        C      C      - WRITE THE SOLUTIONS ON TAPE
        C      NT = 0
        C      DO 230 IO = 1, M
        C      NS = NT + 1
        C      NT = NT + N
        C      IF (NPR1.EQ.0) GO TO 230
        C      WRITE (ITAPEW,3) IO
        C      WRITE (ITAPEW,2) (A(NN), NN = NS, NT)
        C      230 WRITE (NW) (A(NN), NN = NS, NT)
        C
        C      IF(LASTRS) GO TO 295
        C*** ***IF THERE ARE MORE RHS TO BE GOTTEN FROM RHS TAPE, SWITCH TAPES
        C*** ***BACK SO THAT MT WILL CONTAIN THE TRAPEZOIDAL MATRIX
        C*** ***NATAPE WILL HAVE NOTHING USEFUL ON IT.
        C      NTEMP = NATAPE
        NATAPE = MT
        MT = NTEMP
        REWIND NATAPE
        IFILES(LTape) = LFILE
        CALL GEDLAB (8HFUTSOL02, LTape, NAME, LFILE, IRD, JCD)
        295 CONTINUE
        C      *** REWIND ALL FILES EXCEPT THE OUTPUT FILE NW
        C      REWIND NI
        C      REWIND MM
        C      REWIND NO
        C      REWIND NAT
        C      REWIND RHSTAP
        MD = MTOTAL
        9999 CONTINUE
        C
        C      FORMATS
        C
        C      2 FORMAT (1HO, 6E20.8)
        C      3 FORMAT (1HO, 1OHCOLUMN NO., 16.2X, 17HOF GAMMAS FOLLOWS, //)
        C
        C      RETURN
        END
        C
        C      FUTSOL 401
        FUTSOL 402
        FUTSOL 403
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        FUTSOL 409
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        FUTSOL 445
        FUTSOL 446
        FUTSOL 447
  
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#### SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE
3 FUTSOL	1
	55 REFERENCES 445

SUBROUTINE FUTSOL		74 / 74	OPT = 1
VARIABLES	SN	TYPE	RELOCATION
111355	A	COMPLEX	ARRAY
1452	B	REAL	
1453	C	REAL	ARRAY
1515	DUMMY	REAL	
1435	I	INTEGER	
1501	IB	INTEGER	
1	IFILES	INTEGER	
1431	INIT	INTEGER	
1456	INITP1	INTEGER	
1504	IO	INTEGER	
1464	IRD	INTEGER	
0	ITAPES	INTEGER	
1411	ITAPEW	INTEGER	
1434	J	INTEGER	
1465	JCD	INTEGER	
1444	JCNT	INTEGER	
1405	JPASS1	LOGICAL	
1440	K	INTEGER	
1462	KCNT	INTEGER	
0	KD	INTEGER	F . P .
1463	KEND	INTEGER	
1454	KF	INTEGER	
0	KFILES	INTEGER	
1430	KINIT	INTEGER	
1455	KLEFT	INTEGER	
1441	KM1	INTEGER	
1507	KOLD	INTEGER	
1413	KORE	INTEGER	
1474	KP1	INTEGER	
1467	KREAD	INTEGER	
1466	KRED	INTEGER	
1436	KSUM	INTEGER	
1451	KSUMP1	INTEGER	
1407	LAST	LOGICAL	
1406	LASTRS	LOGICAL	
0	LFILE	INTEGER	F . P .
1470	LREAD	* INTEGER	
0	LTAPE	INTEGER	F . P .

SUBROUTINE FUTSOL		74/74 OPT=1		85/01/23. 08.10.44		PAGE
VARIABLES 1415 M	SN TYPE INTEGER	RELOCATION		FTN 4.8+577		10
1443 MAXH	INTEGER	REFS 80	53	55	72	78
1442 MAXW	INTEGER	REFS 247	82	92	158	182
1442 MD	INTEGER	REFS 0	257	263	279	245
1442 MM	INTEGER	REFS MMAX	332	333	339	324
1442 MN	INTEGER	REFS MM1	52	56	71	327
1442 MN	INTEGER	REFS MNR	112	137	202	408
1426 MP1	INTEGER	REFS MRHS	112	136	201	212
1426 MT	INTEGER	REFS MRHS	213	231	213	331
1425 MTOTAL	INTEGER	F. P. F. P.	DEFINED 1	436	135	330
1412 N	INTEGER	REFS NAME	REFS NAME	DEFINED 1	136	200
1510 NA	INTEGER	REFS NAT	REFS NAT	DEFINED 1	328	330
1513 NBEG	INTEGER	REFS NBEG	REFS NBEG	DEFINED 1	232	201
1410 NATAPE	INTEGER	REFS NATAPE	REFS NATAPE	DEFINED 1	232	201
1511 * NBEG	INTEGER	REFS NBEGL	REFS NBEGL	DEFINED 1	232	201
1432 * NBEG	INTEGER	REFS NBEGL	REFS NBEGL	DEFINED 1	232	201
0 ND	INTEGER	F. P. F. P.	REFS REFS	DEFINED 1	232	201
1424 NEL	INTEGER	REFS NELOLD	REFS NELOLD	DEFINED 1	232	201
1506 NELOLD	INTEGER	REFS NEND	REFS NEND	DEFINED 1	232	201
1433 NEND	INTEGER	REFS NEND	REFS NEND	DEFINED 1	232	201
1477 NF	INTEGER	F. P. F. P.	REFS REFS	DEFINED 1	232	201
0 NI	INTEGER	REFS NIN	REFS NIN	DEFINED 1	232	201
1421 NIN	INTEGER	REFS NIN	REFS NIN	DEFINED 1	232	201
1471 NL	INTEGER	REFS NL	REFS NL	DEFINED 1	232	201
1437 NLCNT	INTEGER	REFS NN	REFS NN	DEFINED 1	232	201
1423 NN	INTEGER	REFS NN	REFS NN	DEFINED 1	232	201
1457 NNEW	INTEGER	F. P. F. P.	REFS REFS	DEFINED 1	232	201
0 NO	INTEGER	REFS NO	REFS NO	DEFINED 1	232	201

SUBROUTINE FUTSOL      74 / 74    OPT = 1

VARIABLES	SN	TYPE	RELOCATION	
1450 NOLD		INTEGER		
1451 NOUT		INTEGER		
1502 NP		INTEGER		
1473 NPASS		INTEGER		
1417 NPM		INTEGER		
1445 NPP		INTEGER		
O NPI		INTEGER	F. P.	
1472 NREM		INTEGER		
1461 NREMAN		INTEGER		
1446 NROW		INTEGER		
1475 NS		INTEGER		
1500 NT		INTEGER		
1447 NTBEG		INTEGER		
1512 NTEND		INTEGER		
1450 NTEND		INTEGER		
O NW		INTEGER	F. P.	
1505 N1		INTEGER		
1503 N2		INTEGER		
O RHSTAP		INTEGER	F. P.	
1403 SUM		COMPLEX		

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
GEDLAB		6	221	425
GETROW		4	97	110
SQRT	REAL	1	LIBRARY	227
INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
MAXO	INTEGER	0	INTRIN	55
MINO	INTEGER	0	INTRIN	53
STATEMENT LABELS			DEF LINE	REFERENCES
O 1	INACTIVE	35		
1366 2	FMT	442	413	
1371 3	FMT	443	412	
22 5		50	47	
26 6		52	49	
61 109		74	426	
O 110		89	86	
121 111		96	156	
O 112		122	120	

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VARIABLES	SN	TYPE	RELOCATION	
1450 NOLD		INTEGER	REFS	187
1451 NOUT		INTEGER	REFS	372
1502 NP		INTEGER	REFS	367
1473 NPASS		INTEGER	REFS	270
1417 NPM		INTEGER	REFS	256
1445 NPP		INTEGER	REFS	55
O NPI		INTEGER	REFS	2*123
1472 NREM		INTEGER	REFS	167
1461 NREMAN		INTEGER	REFS	217
1446 NROW		INTEGER	REFS	411
1475 NS		INTEGER	REFS	411
1500 NT		INTEGER	REFS	411
1447 NTBEG		INTEGER	REFS	411
1512 NTEND		INTEGER	REFS	422
1450 NTEND		INTEGER	REFS	422
O NW		INTEGER	REFS	134
1505 N1		INTEGER	REFS	134
1503 N2		INTEGER	REFS	134
O RHSTAP		INTEGER	REFS	134
1403 SUM		COMPLEX	REFS	134

SUBROUTINE MACH

FTN 4.8+577

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115      C
          IF (KK EQ 1) NPOINT = 0
          CALL MODAZ (KK,NQ,ITAPE,WILK,QZ,NPOINT,ENDX,ES,EL,KEND)
          CALL TIMEB (23,23HFROM MACH, AFTER MODAZ )
          IF (KSURF) WILK= TRUE
          IF (KSURF) REWIND MTAP14
          IF (KSURF) CALL HELZ (KK,NQ,NCS,ES,EL,KEND,1)
          IF (KSURF)
          1CALL MODAZ (KK,NQ,MTAP14,WILK,QZ,NPOINT,ENDX,ES,EL,KEND)
          IF (KSURF) CALL HELZ (KK,NQ,NCS,ES,EL,KEND,2)
          CALL DSPMD ( KK , NQ )
          CALL TIMEB (23,23HFROM MACH, AFTER DSPMD )
          2 NWI (KK)=NWB
          300 NDI (KK)=NDB
          10 XM=0.0
          YM=0.0
          DO 15 I=1,NS
          XM=AMAX((XM,XI(I)))
          15 YM=AMAX1(YM,YI(I))
          30 NL = XM + 1.0
          LL=2 * (YM+1.0)
          REWIND MTAP11
          C
          NRF = LC(4)
          IF ((LC(1) .EQ. -1) GO TO 42
          IF ((LC(1) .EQ. 2 OR LC(33) .EQ. 1) GO TO 43
          IF ((LC(13) .EQ. 1) NRF = NRVBO
          GO TO 42
          43 NRF = 1
          42 CONTINUE
          NKF = 0
          DO 150 I0=1,NRF
          NF = 0
          REWIND MTAP3
          DO 149 KK = 1,NS
          NKF = NKF + 1
          KDRAW=KPLOT(KK)
          NF=NF+1
          NWB=NWI (KK)
          NDB=NDI (KK)
          READ (MTAP3) NWB,ENDX ,ES,EL,KEND ,NDB
          888 DO 401 IJ=1,NWB
          401 READ(MTAP3) XW(IJ),YW(IJ),AW(IJ),IND(IJ)
          IF (NDB.EQ.0) GO TO 420
          DO 402 IJ=1,NDB
          402 READ(MTAP3) XD(IJ),YD(IJ),AD(IJ)
          420 READ(MTAP3) DUMMY
          IF ( LC(33) .NE. 0 ) VBO = 1.0E+10
          IF ( KQINT ) VBO = RVBO(10)
          IF ( NOT KQINT ) VBO = VVBO(10)
          ES=ESR(KK)
          P = 0.0
          IF ( LC(33) .EQ. 0 .OR. LC(1) .NE. 2 ) P = ES / (VBO*BR)
          XR=0.0
          X1=0.0
          NDB=(NL*(NL-1))/2+LL
          IF (LC(22).EQ.1) GOTO 36
          155
          888 DO 401 IJ=1,NWB
          401 READ(MTAP3) XW(IJ),YW(IJ),AW(IJ),IND(IJ)
          IF (NDB.EQ.0) GO TO 420
          DO 402 IJ=1,NDB
          402 READ(MTAP3) XD(IJ),YD(IJ),AD(IJ)
          420 READ(MTAP3) DUMMY
          IF ( LC(33) .NE. 0 ) VBO = 1.0E+10
          IF ( KQINT ) VBO = RVBO(10)
          IF ( NOT KQINT ) VBO = VVBO(10)
          ES=ESR(KK)
          P = 0.0
          IF ( LC(33) .EQ. 0 .OR. LC(1) .NE. 2 ) P = ES / (VBO*BR)
          XR=0.0
          X1=0.0
          NDB=(NL*(NL-1))/2+LL
          IF (LC(22).EQ.1) GOTO 36
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      CALL PTABLE (1,47,47)          59
      1 HSUPERSONIC UNSTEADY AERODYNAMICS USING MACH BOX)    MACH
      KTABLE = 2                      MACH 60
      CALL PTABLE (1,20,20)           MACH 61
      1 HPROCEDURE (MACH BOX)        MACH 62
      C                               MACH 63
      C                               MACH 64
      KQRS=LC(6)                     MACH 65
      NOPE = LC(7)                   MACH 66
      AM = FMACH                    MACH 67
      KQINT = FALSE                 MACH 68
      IF (LC(13).NE.0) KQINT= TRUE. MACH 69
      REWIND MTAP50                  MACH 70
      NS = LC(3)                     MACH 71
      NO = LC(2)                     MACH 72
      DO 40 I=1,NS                  MACH 73
      40 NCSS(I) = 0                 MACH 74
      READ (ITAPER,700) KSURF , NBEL , LINC      MACH 75
      IF (KSURF ) READ (ITAPER,1005) (NCSS(I),I=1,NS)    MACH 76
      CALL TIMEB (23,23HFROM MACH, BEGIN      MACH 77
      REWIND MTAP2                   MACH 78
      READ (ITAPER,1005) (NSAA(K),K=1,NS)    MACH 79
      DO 81 IL = 1,NS                MACH 80
      81 KPLOT(IL) = 0               MACH 81
      IF (LC(8).EQ.0) GO TO 83         MACH 82
      READ (ITAPER,1015) (KPLOT(IL),IL=1,NS)  MACH 83
      83 DO 84 IL = 1,NS            MACH 84
      84 BEX(IL) = 0.0               MACH 85
      IF (.NOT.NBEL) GO TO 67        MACH 86
      READ (ITAPER,59) (BEX(K),K=1,NS)   MACH 87
      WRITE (ITAPERW,76)             MACH 88
      DO 77 I = 1,NS                MACH 89
      IF (BEX(I) EQ.0.0) GO TO 77    MACH 90
      WRITE (ITAPERW,78) I , BEX(I)   MACH 91
      77 CONTINUE                   MACH 92
      67 DO 57 I = 1,NS            MACH 93
      LZ(I) = 1                     MACH 94
      IINC(I) = 10                  MACH 95
      IF (KPLOT(I).EQ.0) GO TO 57    MACH 96
      READ (ITAPER,1015) LZ(J) , IINC(I)  MACH 97
      57 CONTINUE                   MACH 98
      C                               MACH 99
      C                               MACH 100
      REWIND MTAP3                  MACH 101
      DO 300 KK=1,NS                MACH 102
      CALL EVOVLE (BETA,ESR,EL,XI,YI,KK,IM,ENDX,KEND,ES) MACH 103
      CALL TIMEB (23,23HFROM MACH, AFTER EVOVLE)       MACH 104
      CALL PLAN (KK,AM,XI(KK))        MACH 105
      CALL PUDLAB (8HMACH O1,MTAP9,NAMSRF,KK,IRD,JCD) MACH 106
      KSURF = FALSE                 MACH 107
      WILK= .FALSE.                  MACH 108
      C --- DOES THIS SURFACE HAVE CONTROL SURFACES ? ----
      C
      NCS = NCSS(KK)                MACH 109
      IF ( NCS .NE. 0 ) KSURF = .TRUE. MACH 110
      ITAPE=MTAP9
      IF (KSURF) ITAPE=MTAP8
      IF (KSURF) RFWIND MTAP8

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SUBROUTINE MACH

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PAGE 1

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1      C      SUBROUTINE MACH
2
3      C      DIMENSION XW(350) , YW(350) , XD(250)
4      C      DIMENSION YD(250) , AW(350) , AD(250)
5      C      DIMENSION R1(2000) , PP(350) , XMAX(5)
6      C      DIMENSION LS(5)   , XI(5)   , Y1(5)
7      C      DIMENSION NW1(5)  , ND1(5)  , DWSH(350)
8      C      DIMENSION Q(40,40) , QS(40,40) , IND(350)
9      C      DIMENSION NSAA(5) , KPLQT(5) , ESR(5)
10     C      DIMENSION NCSS(5)  , NCLER(5) , NCTER(5)
11     C      DIMENSION CLEXR(20,5) , CLEYR(20,5) , CTEXR(20,5)
12     C      DIMENSION CTYR(20,5) , LC(40)   , MACH 13
13     C      DIMENSION QMWT(40,5) , QWT(5)  , MACH 14
14     C      DIMENSION RVBO(30) , RVBO(15) , MACH 15
15     C      DIMENSION LZ(5)   , IINC(5)  , MACH 16
16     C      DIMENSION NAME(2) , NAMSRF(2) , MACH 17
17     C      DIMENSION DUMMY(50) , MACH 18
18     C      DIMENSION TSHF(1) , MACH 19
19     C      DIMENSION ITAPES(50) , MACH 20
20     C      COMPLEX Q , QS , R1 , PP , DWSH
21     C      MACH 21
22     C      MACH 22
23     C      MACH 23
24     C      MACH 24
25     C      COMMON /FLUTQ / QMWT , QWT
26     C      COMMON /COMA / LC , BR
27     C      COMMON /FLUTAN/ FMACH , BETA , VVBO , RVBO , NRVBO
28     C      COMMON /CORPSE/R1
29     C      COMMON /TOMB/XW,YW,NDB,LS,XMAX,NWB,AD,XD,YD,IND,AW
30     C      COMMON /IDIOT/CLEXR,CLEYR,CTEXR,CTEYR,NCLER,NCTER,NS
31     C      COMMON /BOXS/ BEL , BSR
32     C      COMMON /BXL / BEX(5)
33     C      COMMON /KIMA / LZ , IINC
34     C      COMMON /CTAPES / ITAPES
35     C      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP
36     C      COMMON /CTSHF / LTSHF , TSHF
37     C      COMMON /CTABLE/ KTABLE,NPASS , NROWS , NCOLS , NCOLST,KTABLO,NPAGEA
38     C      .ITAPET
39     C      LOGICAL KSURF, WILK, KQINT, NBEL, NPTF, LINC
40     C      DATA NAMSRF /4HSURRF,4HACE /
41     C      IRD=99999
42     C      JCD=99999
43     C      NTAP2 = ITAPES(22)
44     C      NTAP3 = ITAPES(23)
45     C      NTAP8 = ITAPES(28)
46     C      NTAP9 = ITAPES(29)
47     C      NTAP10 = ITAPES(30)
48     C      NTAP11 = ITAPES(31)
49     C      NTAP12 = ITAPES(32)
50     C      NTAP14 = ITAPES(34)
51     C      NTAP50 = ITAPES(50)
52     C      NROWS = 1
53     C      NCOLS = 3
54     C      MACH 54
55     C      MACH 55
56     C      MACH 56
57     C      MACH 57
58     C      MACH 58
59     C      MACH 59
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SUBROUTINE GENF      74/74      OPT=1

FTN 4.8+577

PAGE 9

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
COMA	41	9 NTP10 (1)
CTAPES	50	0 LC (40)
XYZ	350	0 ITAPES (50) 0 YS (50) 150 DELZS (50) 300 DUMMY (50)

STATISTICS

PROGRAM LENGTH CM LABELED COMMON LENGTH 520000B CM USED	14103B 1427B 6211 791
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85/01/23. 08.10.44

## STATEMENT LABELS

1020	10	FMT	209	164
1034	12	FMT	211	177
1050	20	FMT	213	171
1055	30	FMT	214	188
1070	32	FMT	216	104
1101	34	FMT	NO REFS	219
1114	36	FMT	NO REFS	221
1120	40	FMT	222	108
0	50	0	54	51
0	60	0	64	62
0	70	0	65	58
0	80	0	66	57
130	90	0	76	74
154	100	0	223	32
1124	111	0	92	88
0	150	0	102	77
0	200	0	109	105
0	235	0	110	103
335	236	0	137	132
0	238	0	151	122
0	240	0	152	116
507	245	0	172	165
0	250	0	173	163
601	251	0	260	185
0	260	0	186	178
631	265	0	187	174
634	266	0	198	194
0	272	0	200	191
0	275	0	201	67
0	300	0	201	67

LNOPTS	LABEL	INDEX	FROM TO	LENGTH	PROPERTIES	NOT INNER
12	2	I	29 31	14B	INSTACK	
20	2	J	30 31	2B	INSTACK	
43	1	I	38 41	5B	INSTACK	
57	50	I	43 46	3B	INSTACK	
77	60	L	51 54	3B	INSTACK	
107	80	L	58 65	21B	INSTACK	NOT INNER
122	70	I	62 64	3B	INSTACK	EXT REFS NOT INNER
131	300	J	67 201	543B	INSTACK	EXT REFS NOT INNER
155	200	K	77 102	132B	OPT	EXT REFS NOT INNER
210	150	I	88 92	15B	OPT	EXT REFS
312	235	I	105 109	23B	OPT	NOT INNER
352	240	LB	122 151	135B	OPT	EXT REFS
405	238	I	132 137	16B	OPT	EXT REFS
544	250	K	165 172	35B	INSTACK	EXT REFS NOT INNER
610	260	L	178 185	21B	INSTACK	
637	275	JG	191 200	32B	INSTACK	
653	272	IX	194 198	6B	INSTACK	
COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)						
BODY	340	O RO	(100)	100 ROP	(100)	200 NBEA (20)
		220 BGMA	(20)	240 MRK	(40)	280 XBO (20)
NTPS	10	300 YBO	(20)	320 ZBO	(20)	
		0 NTP1	(1)	1 NTP2	(1)	2 NTP3 (1)
		3 NTP4	(1)	4 NTP5	(1)	5 NTP6 (1)
		6 NTP7	(1)	7 NTP8	(1)	8 NTP9 (1)

SUBROUTINE	GENF	74/74	OPT=1	RELOCATION	7 TN 4.8+577	85/01/23	08.10.44	PAGE	7
VARIABLES				NTPS	REFS	6	I/O REFS	33	73
2 NTP3				NTPS	REFS	6	REFS	6	
3 NTP4				NTPS	REFS	6	REFS	6	
4 NTP5				NTPS	REFS	6	REFS	6	
5 NTP6				NTPS	REFS	6	REFS	6	
6 NTP7				NTPS	REFS	6	REFS	6	
7 NTP8				NTPS	REFS	6	REFS	6	
10 NTP9			*	NTPS	REFS	6	REFS	6	
1211 NWP				ARRAY	DEFINED	42	18	89	75
12064 P				ARRAY	DEFINED	73	21	108	106
1174 PRES				COMPLEX	REFS	19	90	91	106
1152 PRT1				COMPLEX	REFS	19	94	95	107
1154 PRT2				COMPLEX	REFS	19	142	143	89
1156 PRT3				COMPLEX	DEFINED	93	98	99	144
1160 PRT4				COMPLEX	DEFINED	96	145	99	147
0 RO				REAL	REFS	19	98	99	148
144 ROP				REAL	REFS	19	146	99	147
0 SDELY				REAL	REFS	4	134	99	147
1227 SGAM				REAL	ARRAY	BODY	61	63	134
1224 SIGN1				REAL	ARRAY	BODY	61	63	89
1225 SIGN2				REAL	ARRAY	F.P.	61	63	89
0 X				REAL	ARRAY	F.P.	94	98	80
1212 XA				REAL	ARRAY	F.P.	95	99	81
1213 XB				REAL	ARRAY	F.P.	11	61	85
2154 XBLE				REAL	ARRAY	F.P.	48	158	1
430 XBO				REAL	ARRAY	BODY	160	136	136
1214 XC				REAL	ARRAY	BODY	12	146	47
0 XIJ				REAL	ARRAY	F.P.	4	48	47
1240 XMULT				REAL	ARRAY	F.P.	161	162	59
0 XOC				REAL	ARRAY	F.P.	10	91	59
0 Y				REAL	ARRAY	F.P.	10	97	131
1246 YBOS				REAL	ARRAY	BODY	143	144	131
454 YBO				REAL	ARRAY	BODY	11	108	108
1252 YOS				REAL	ARRAY	XYZ	11	108	108
0 YS				REAL	ARRAY	XYZ	131	149	128
1236 YSB				REAL	ARRAY	BODY	184	183	181
500 ZBO				REAL	ARRAY	BODY	4	49	1
144 ZS				REAL	ARRAY	XYZ	10	171	1
1237 ZSB				REAL	ARRAY	XYZ	23	100	166
0 ZZ				REAL	ARRAY	F.P.	149	184	171
				VARIABLES USED AS FILE NAMES. SEE ABOVE	REFS	11	108	108	171
EXTERNALS				REAL	ARGS	1 LIBRARY	82	128	166
COS				REAL	ARGS	1 LIBRARY	83		171
SIN					DEF LINE	DEF LINE	REFERENCES		181
INLINE FUNCTIONS				REAL	1 INTRIN	131			
ABS				REAL	1 INTRIN	47			
FLOAT				REAL	DEF LINE	DEF LINE	REFERENCES		
STATEMENT LABELS					41	38			
0 1					2	2			

ROUTINE	GENF	74/74	OPT=1	RELOCATION	FTN 4.8+577	85/01/23 . 08 . 10.44	PAGE	6
VARIABLES	SN	TYPE		ARRAY	REFS	195	196	196
10424	GF	COMPLEX			REFS	17	196	196
1136	GFT	COMPLEX			REFS	17	196	196
1204	I	INTEGER			REFS	31	39	39
					REFS	91	106	2*107
					DEFINED	29	38	43
					REFS	132	43	62
1250	IB	INTEGER			REFS	192	192	192
1217	IBX1	INTEGER			REFS	56	60	117
1245	IL	INTEGER			REFS	181	182	DEFINED
1222	IP	INTEGER			REFS	75	75	75
1215	IP1	INTEGER			REFS	75	75	DEFINED
0	ITAPES	INTEGER			REFS	2*61	26	1/O REFS
1202	ITAPEW	INTEGER			DEFINED	177	184	188
1251	IX	INTEGER			REFS	3*195	196	DEFINED
1221	I1	INTEGER			REFS	2*61	62	88
1220	I2	INTEGER			DEFINED	59	86	126
1205	J	INTEGER			REFS	59	62	88
1247	JG	INTEGER			DEFINED	56	60	87
1223	K	INTEGER			REFS	31	104	164
					DEFINED	30	67	177
					REFS	199	199	194
					REFS	78	79	128
					REFS	2*93	94	129
					REFS	4*91	95	132
					REFS	2*100	166	177
					DEFINED	77	165	177
1234	KB	INTEGER			REFS	133	134	191
1244	KL	INTEGER			REFS	179	180	192
1216	L	INTEGER			REFS	52	53	126
1235	LB	INTEGER			DEFINED	51	58	126
0	LC	INTEGER		ARRAY	COMA	124	124	127
0	LIM	INTEGER		ARRAY	F.P.	150	150	128
1233	LL	INTEGER			DEFINED	7	13	130
					REFS	10	86	131
					REFS	125	127	132
					REFS	145	145	133
1231	L1	INTEGER			REFS	142	146	134
1232	L2	INTEGER			REFS	122	178	135
1203	MID	INTEGER			REFS	122	178	136
1210	MK	INTEGER			REFS	29	30	137
1207	MMRK	INTEGER			REFS	2*40	42	138
360	MRK	INTEGER			DEFINED	40	42	139
1206	MTAP	INTEGER			REFS	4	37	140
0	NB	INTEGER			DEFINED	36	1/O REFS	141
310	NBEA	INTEGER			REFS	38	57	142
0	NBOX	INTEGER			DEFINED	1	1	143
					REFS	4	60	144
					DEFINED	50	55	145
0	NBV	INTEGER			REFS	2*107	49	146
0	NDELT	INTEGER			REFS	47	49	147
0	NMD	INTEGER			REFS	67	191	148
0	NSTRIP	INTEGER			REFS	77	118	149
0	NSV	INTEGER			REFS	2*169	2*170	150
0	NTOT	INTEGER			REFS	74	75	151
0	NTP1	INTEGER			REFS	6	1/O REFS	152
11	NTP10	INTEGER			REFS	6	35	153
					REFS	6	190	154

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CARD NR. SEVERITY DETAILS

DIAGNOSIS OF PROBLEM

197 I 272 THIS IF DEGENERATES INTO A SIMPLE TRANSFER TO THE LABEL INDICATED.

## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS 3 GENF	DEF LINE 1	REFERENCES 225	RELOCATION F.P.	REFS	47	49	DEFINED DEFINED	1
VARIABLES	SN TYPE		ARRAY	REFS	11	195	DEFINED DEFINED	192
O ACAP	REAL		ARRAY	REFS	4	139	141	
1334 BF	REAL		BODY	REFS	7			
334 BGMA	REAL		COMA	REFS	49	166	183	DEFINED 1
50 BR	REAL		F.P.	REFS	12	63	134	138
O B2	REAL		ARRAY	REFS	145	146	150	141
2200 CBODY	REAL			REFS	135	136	134	142
1241 CFAC	REAL			REFS	84	101	157	
1226 OGAM	REAL			REFS	19	101	162	188
1150 CLI	COMPLEX			REFS	72	101	157	
1172 CLIB	COMPLEX		ARRAY	REFS	20	150	157	150
13524 CLJ	COMPLEX			REFS	18	90	93	142
1176 CLJXK	COMPLEX			REFS	146	150	167	90
1144 CM	COMPLEX			REFS	123	135	184	
1166 CMB	COMPLEX			REFS	21	169	171	141
13670 CMU	COMPLEX		ARRAY	REFS	19	98	155	135
1200 CMJXK	COMPLEX			REFS	70	98	155	188
1146 CN	COMPLEX			REFS	20	147	155	147
1170 CNB	COMPLEX			REFS	18	91	96	168
372 CWIG	REAL			REFS	45	79	91	184
1142 CY	COMPLEX			REFS	21	170	171	
1164 CYB	COMPLEX			REFS	19	99	156	
1140 CZ	COMPLEX			REFS	71	99	156	161
1162 CZB	COMPLEX			REFS	20	148	156	168
62 DELYS	REAL		XYZ	REFS	23	90	91	170
226 DELZS	REAL			REFS	19	95	154	
454 DUMMY	REAL			REFS	68	94	153	
1242 DYB	REAL			REFS	20	143	153	148
1243 DZB	REAL			REFS	69	95	154	97
O EV	REAL		XYZ	REFS	20	144	154	101
1230 FACT	REAL		XYZ	REFS	19	94	153	143
310 FGAMMA	REAL		XYZ	REFS	23	95	99	144
O FL	REAL		XYZ	REFS	143	147	149	139
2224 FREQ	REAL		F.P.	REFS	144	148	149	141
GENFM	COMPLEX		ARRAY	REFS	10	91	108	1
				REFS	101	150	150	149
				REFS	23	82	83	
				REFS	48	32	32	
				REFS	16	203	203	
				REFS			1	
				REFS			31	199

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250 CONTINUE  
251 CONTINUE  
IF (NB .EQ .0) GO TO 265  
KL = 0  
IF (LCLB) EQ. 0) GOTO 265  
WRITE (ITAPEW,12) J  
DO 260 L=L1,L2  
KL = KL+1  
IL = NBOX + NBEA(KL)  
YSB = Y(IL)  
ZSB = ZZ(IL)  
YBOS = YSB/B2  
WRITE (ITAPEW,20) KL,YSB,ZSB,YBOS,CLJ(L),CMJ(L)  
260 CONTINUE  
265 CONTINUE  
IF (LCLB) EQ. 0) GOTO 266  
WRITE (ITAPEW,30) CZ, CY, CM, CN, CLI  
266 CONTINUE  
REWIND NTP10  
DO 275 JG=1,NMD  
READ (NTP10) (BF(1B), IB=1,NTOT)  
GFT =(0.0.0)  
DO 272 IX=1,NTOT  
GF(IX)= P(IX)\*BF(IX)  
GFT = GFT + GF(IX)  
IF (NB .EQ .0) GO TO 272  
272 CONTINUE  
GENFM(JG)=GFT  
275 CONTINUE  
300 CONTINUE  
REWIND MTAP  
WRITE (MTAP) GENFM  
REWIND MTAP

C C FORMATS  
C  
10 FORMAT (1H1,4OX, 7HMODE NO,14//10X, 9HSTRIP NO.,5X,1HY,12X,1HZ,  
112X, 3HYOS,10X,16HLIFT COEFFICIENT,18X,18HMOMENT COEFFICIENT/)  
12 FORMAT (1H0,4OX, 7HMODE NO,14//10X, 9HBODY NO.,5X,1HY,12X,1HZ,  
112X, 3HYOS,10X,16HLIFT COEFFICIENT,18X,18HMOMENT COEFFICIENT/)  
20 FORMAT (1H0,13X,14, 3F12.4, 2F16.6, 5X, 2F16.6)  
30 FORMAT (1H0,3X//15X, 4HCZ =,2F16.6,10X,4HCY =,2F16.6/15X,  
1 2F16.6,10X,4HCN =,2F16.6/15X,10HCL(ROLL) =,2F16.6/)  
32 FORMAT (1H1,4OX, 7HMODE NO,14//  
1 5X, 9HBOX NO. ,3X, 3HXOC,5X,2H X,7X,2HY .7X,2HZ .15X,  
2 9HPRESSES//)  
34 FORMAT (1H0,3X//15X, 13HPRESSURE MODE,5X,15HDEFLECTION MODE ,10X,  
1 45HGENERALIZED FORCES PER UNIT DYNAMIC PRESSURE ./)  
36 FORMAT (1H0,20X,14,16X,14,5X,2E18.8)  
40 FORMAT (1H0, 5X,13,F10.5,3F11.5,2E18.8)  
111 FORMAT (1H0,5X,19HREDUCED FREQUENCY =,E10.3 )  
225 RETURN  
END

C

250 CONTINUE  
251 CONTINUE  
IF (NB .EQ .0) GO TO 265  
KL = 0  
IF (LCLB) EQ. 0) GOTO 265  
WRITE (ITAPEW,12) J  
DO 260 L=L1,L2  
KL = KL+1  
IL = NBOX + NBEA(KL)  
YSB = Y(IL)  
ZSB = ZZ(IL)  
YBOS = YSB/B2  
WRITE (ITAPEW,20) KL,YSB,ZSB,YBOS,CLJ(L),CMJ(L)  
260 CONTINUE  
265 CONTINUE  
IF (LCLB) EQ. 0) GOTO 266  
WRITE (ITAPEW,30) CZ, CY, CM, CN, CLI  
266 CONTINUE  
REWIND NTP10  
DO 275 JG=1,NMD  
READ (NTP10) (BF(1B), IB=1,NTOT)  
GFT =(0.0.0)  
DO 272 IX=1,NTOT  
GF(IX)= P(IX)\*BF(IX)  
GFT = GFT + GF(IX)  
IF (NB .EQ .0) GO TO 272  
272 CONTINUE  
GENFM(JG)=GFT  
275 CONTINUE  
300 CONTINUE  
REWIND MTAP  
WRITE (MTAP) GENFM  
REWIND MTAP

C C FORMATS  
C  
10 FORMAT (1H1,4OX, 7HMODE NO,14//10X, 9HSTRIP NO.,5X,1HY,12X,1HZ,  
112X, 3HYOS,10X,16HLIFT COEFFICIENT,18X,18HMOMENT COEFFICIENT/)  
12 FORMAT (1H0,4OX, 7HMODE NO,14//10X, 9HBODY NO.,5X,1HY,12X,1HZ,  
112X, 3HYOS,10X,16HLIFT COEFFICIENT,18X,18HMOMENT COEFFICIENT/)  
20 FORMAT (1H0,13X,14, 3F12.4, 2F16.6, 5X, 2F16.6)  
30 FORMAT (1H0,3X//15X, 4HCZ =,2F16.6,10X,4HCY =,2F16.6/15X,  
1 2F16.6,10X,4HCN =,2F16.6/15X,10HCL(ROLL) =,2F16.6/)  
32 FORMAT (1H1,4OX, 7HMODE NO,14//  
1 5X, 9HBOX NO. ,3X, 3HXOC,5X,2H X,7X,2HY .7X,2HZ .15X,  
2 9HPRESSES//)  
34 FORMAT (1H0,3X//15X, 13HPRESSURE MODE,5X,15HDEFLECTION MODE ,10X,  
1 45HGENERALIZED FORCES PER UNIT DYNAMIC PRESSURE ./)  
36 FORMAT (1H0,20X,14,16X,14,5X,2E18.8)  
40 FORMAT (1H0, 5X,13,F10.5,3F11.5,2E18.8)  
111 FORMAT (1H0,5X,19HREDUCED FREQUENCY =,E10.3 )  
225 RETURN  
END

250 CONTINUE  
251 CONTINUE  
IF (NB .EQ .0) GO TO 265  
KL = 0  
IF (LCLB) EQ. 0) GOTO 265  
WRITE (ITAPEW,12) J  
DO 260 L=L1,L2  
KL = KL+1  
IL = NBOX + NBEA(KL)  
YSB = Y(IL)  
ZSB = ZZ(IL)  
YBOS = YSB/B2  
WRITE (ITAPEW,20) KL,YSB,ZSB,YBOS,CLJ(L),CMJ(L)  
260 CONTINUE  
265 CONTINUE  
IF (LCLB) EQ. 0) GOTO 266  
WRITE (ITAPEW,30) CZ, CY, CM, CN, CLI  
266 CONTINUE  
REWIND NTP10  
DO 275 JG=1,NMD  
READ (NTP10) (BF(1B), IB=1,NTOT)  
GFT =(0.0.0)  
DO 272 IX=1,NTOT  
GF(IX)= P(IX)\*BF(IX)  
GFT = GFT + GF(IX)  
IF (NB .EQ .0) GO TO 272  
272 CONTINUE  
GENFM(JG)=GFT  
275 CONTINUE  
300 CONTINUE  
REWIND MTAP  
WRITE (MTAP) GENFM  
REWIND MTAP

C C FORMATS  
C  
10 FORMAT (1H1,4OX, 7HMODE NO,14//10X, 9HSTRIP NO.,5X,1HY,12X,1HZ,  
112X, 3HYOS,10X,16HLIFT COEFFICIENT,18X,18HMOMENT COEFFICIENT/)  
12 FORMAT (1H0,4OX, 7HMODE NO,14//10X, 9HBODY NO.,5X,1HY,12X,1HZ,  
112X, 3HYOS,10X,16HLIFT COEFFICIENT,18X,18HMOMENT COEFFICIENT/)  
20 FORMAT (1H0,13X,14, 3F12.4, 2F16.6, 5X, 2F16.6)  
30 FORMAT (1H0,3X//15X, 4HCZ =,2F16.6,10X,4HCY =,2F16.6/15X,  
1 2F16.6,10X,4HCN =,2F16.6/15X,10HCL(ROLL) =,2F16.6/)  
32 FORMAT (1H1,4OX, 7HMODE NO,14//  
1 5X, 9HBOX NO. ,3X, 3HXOC,5X,2H X,7X,2HY .7X,2HZ .15X,  
2 9HPRESSES//)  
34 FORMAT (1H0,3X//15X, 13HPRESSURE MODE,5X,15HDEFLECTION MODE ,10X,  
1 45HGENERALIZED FORCES PER UNIT DYNAMIC PRESSURE ./)  
36 FORMAT (1H0,20X,14,16X,14,5X,2E18.8)  
40 FORMAT (1H0, 5X,13,F10.5,3F11.5,2E18.8)  
111 FORMAT (1H0,5X,19HREDUCED FREQUENCY =,E10.3 )  
225 RETURN  
END

SUBROUTINE GENF    74/74    OPT=1

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115       CLIB = (0.0,0.0)
           IF (NB .EQ. 0) GO TO 245
           I2 = IBX1
           L1 = NSTRIP+1
           L2 = NSTRIP+NB
           LL = 0
           KB = 0
           DO 240 LB=L1,L2
              CLJ(LB) = (0.0,0.0)
              CMJ(LB) = (0.0,0.0)
              LL = LL+1
              I1 = I2+1
              I2 = IBX1+NBEA(LL)
              YSB = Y(I1)
              ZSB = ZZ(I1)
              XMULT= 1.0
              IF (ABS(YSB).LE.0.0001) XMULT=0.5
              DO 238 I=I1,I2
                 KB = KB+1
                 CFAC = 2.0*RO(KB)*SDELX(I) / (CBODY(LL)**2)
                 CLJ(LB) = CLJ(LB)+P(I)*CFAC
                 CMJ(LB) = CMJ(LB)-P(I)*CFAC*(X(I)-XBLE(LL))/CBODY(LL)
238 CONTINUE
                 DYB = CBODY(LL)
                 IF (BGMA(LL).LT.0.0) DYB=0.0
                 DZB = 0.0
                 IF (BGMA(LL).LT.0.0) DZB=CBODY(LL)
                 PRT2 = CLJ(LB)*CBODY(LL)
                 C2B = C2B + PRT2*Dyb*XMULT
                 CYB = CYB + PRT2*Dzb*XMULT
                 PRT3 = -CMJ(LB)*CBODY(LL)**2
                 PRT4 = CLJ(LB)*CBODY(LL)**XBLE(LL)
                 CMB = CMB + (PRT3+PRT4)*Dyb*XMULT
                 CNB = CNB + (PRT3+PRT4)*Dzb*XMULT
                 FACT = YSB*Dyb + ZSB*Dzb
                 CLIB = CLIB + CLJ(LB)*CBODY(LL)*FACT
240 CONTINUE
245 CONTINUE
                 C2 = C2 + C2B
                 CY = CY + CYB
                 CM = CM + CMB
                 CN = CN + CNB
                 CLI = CLI+ CLIB
                 CZ = KA*CZ
                 CY = -XA*CY
                 CM = XB*CM
                 CN = XC*CN
                 CLI = -XC*CLI
                 IF (LC(B).EQ.0) GOTO 251
                 WRITE (ITAPEW,10) J
DO 250 K=1,NSTRIP
YOS(K) = YS(K)/B2
CLJXK= CLJ(K)
CMJXK= CMJ(K)
IF (NSV.NE.0.AND.K.LE.NSV) CLUXK=2.0*CLUXK
IF (NSV.NE.0.AND.K.LE.NSV) CMUXK=2.0*CMUXK
160
165
170
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DO 80 L=1,NB          59
  I1 = I2+1           GENF
  I2 = IBX1+NBEA(L)  GENF
  XBLE(L) = X(I1)-SDELX(I1)/2.0  GENF
  DO 70 I=I1,I2      60
    CBODY(L) = CBODY(L)+SDELX(I1)  GENF
  70 CONTINUE          61
  80 CONTINUE          62
  90 CONTINUE          63
  DO 300 J=1,NMD      64
    C2 = (0.0,0.0)     GENF
    CY = (0.0,0.0)     GENF
    CM = (0.0,0.0)     GENF
    CN = (0.0,0.0)     GENF
    CLI = (0.0,0.0)    GENF
    READ (NTP3) (P(I), I = 1, NBOX) 65
    IF (NBX.EQ.NTOT) GO TO 100  GENF
    READ (NTP7) (P(IP), IP=IP1,NTOT) 66
  100 CONTINUE          67
  DO 200 K=1,NSTRIP   GENF
    CLJ(K) = (0.0,0.0) 68
    CMJ(K) = (0.0,0.0) 69
    SIGN1= 1.0          GENF
    SIGN2= -1.0         GENF
    I1 = LIM(K,1)       GENF
    I2 = LIM(K,2)       GENF
    DO 150 I=I1,I2      GENF
      PRT1 = P(I)*SDELX(I) 70
      CLJ(K) = CLJ(K) + PRT1/CWIG(K) 71
      CMJ(K) = CMJ(K) - PRT1*(EV(I)-XIJ(K))/(CWIG(K)**2) 72
    150 CONTINUE          73
    PRT2 = CLJ(K)*CWIG(K) 74
    CZ = CZ + PRT2*SDELX(K)*SIGN1 75
    CY = CY + PRT2*DELZS(K)*SIGN2 76
    PRT3 = -CMJ(K)*(CWIG(K)**2) 77
    PRT4 = CLJ(K)*CWIG(K)*XIJ(K) 78
    CM = CM + (PRT3+PRT4)*DELZS(K)*SIGN1 79
    CN = CN + (PRT3+PRT4)*DELZS(K)*SIGN2 80
    FACT = YS(K)*DELYS(K)*SIGN1 + ZS(K)*DELZS(K)*SIGN2 81
    CLI = CLI+ CLJ(K)*CWIG(K)*FACT 82
  200 CONTINUE          83
    IF (LC(7) EQ 0) GO TO 236 84
    WRITE (ITAPEN,32) J 85
    DO 235 I=1,NBOX      86
      PRES = P(I)          87
      IF (NBV.NE.0.AND.I.LE.NBV) PRES=2.0*P(I) 88
      WRITE (ITAPEN,40) I,XOC(I),EV(I),Y(I),ZZ(I),PRES 89
  235 CONTINUE          90
  236 CONTINUE          91
    C2B = (0.0,0.0)     92
    CYB = (0.0,0.0)     93
    CMB = (0.0,0.0)     94
    CNR = (0.0,0.0)     95
  110

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1      SUBROUTINE GENF(NDELT,NB,NSTRIP,NBOX,NTOT,NBV,NSV,NMD,LIM,ACAP,FL, GENF
      C          B2,EV,Y,ZZ,SDELX,XIJ,XOC,X,FREQ) 2
      C
      COMMON/BODY/ RO(100), ROP(100), NBEA(20), BGMA(20), MRK(20,2),
      1      XBO(20), YBO(20), ZBO(20),  GENF 3
      COMMON /NTPS/ NTP1,NTP2,NTP3,NTP4,NTP5,NTP6,NTP7,NTP8,NTP9,NTP10  GENF 4
      COMMON/COMA / LC,BR  GENF 5
      COMMON /CTAPES / ITAPES  GENF 6
      C
      DIMENSION LIM(50,3), XIJ(50), YOS(50), EV(400), SDELX(400)
      DIMENSION BF(400), Y(400), ZZ(400), XOC(400), X(400)  GENF 7
      DIMENSION XBLE(20), CBODY(20)  GENF 8
      DIMENSION LC(40)  GENF 9
      DIMENSION ITAPES(50)  GENF 10
      C
      COMPLEX GENFM(40,40)
      COMPLEX GF(400), GFT
      COMPLEX P(400), CLJ(50), CMJ(50)
      COMPLEX CZ,CY,CN,CL,I,PRT1,PRT2,PRT3,PRT4
      COMPLEX CZB,CYB,CMB,CNB,CLIB
      COMPLEX PRES,CLJXK,CMJXK
      C
      COMMON /XYZ/YS(50),DELYS(50),ZS(50),DELZS(50),FGAMMA(50),CWIG(50)
      1      .DUMMY(50)
      C
      ITAPEW = ITAPES(6)
      C
      MID = 40
      DO 2 I=1,MID
      DO 2 J=1,MID
      2 GENFM(I,J) = 0
      WRITE (ITAPEW,111) FREQ
      REWIND NTP3
      REWIND NTP7
      REWIND NTP10
      MTAP = ITAPES(36)
      MMRK = MRK(1,1)
      DO 1 I = 1,NB
      MK = MRK(I,1)
      IF (MK.LT.MMRK) MMRK = MK
      1 CONTINUE
      NWP = MMRK - 1
      DO 50 I=1,50
      CLJ(I) = (0.0,0.0)
      CMJ(I) = (0.0,0.0)
      50 CONTINUE
      XA = FLOAT(1+NDELT)/(2.0*ACAP)
      XB = -XA/FL
      XC = -FLOAT(1-NDELT)/(2.0*ACAP*B2)
      IP1 = NB0X+1
      DO 60 L=1,20
      XBLE(L) = 0.0
      CBODY(L) = 0.0
      60 CONTINUE
      IBX1 = NB0X
      12 = IBX1
      IF (NB.EQ.0) GO TO 90
      55
      GENF 11
      GENF 12
      GENF 13
      GENF 14
      GENF 15
      GENF 16
      GENF 17
      GENF 18
      GENF 19
      GENF 20
      GENF 21
      GENF 22
      GENF 23
      GENF 24
      GENF 25
      GENF 26
      GENF 27
      GENF 28
      GENF 29
      GENF 30
      GENF 31
      GENF 32
      GENF 33
      GENF 34
      GENF 35
      GENF 36
      GENF 37
      GENF 38
      GENF 39
      GENF 40
      GENF 41
      GENF 42
      GENF 43
      GENF 44
      GENF 45
      GENF 46
      GENF 47
      GENF 48
      GENF 49
      GENF 50
      GENF 51
      GENF 52
      GENF 53
      GENF 54
      GENF 55
      GENF 56
      GENF 57
      GENF 58
```

SUBROUTINE FUTSOL      74/74      OPT=1

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LOOPS    LABEL    INDEX    FROM-TO    LENGTH

PROPERTIES

NOT INNER

605    140    NN    278 283    20B

INSTACK

EXT REFS

613    135    MN    279 282    6B

INSTACK

EXT REFS

632    145    MN    289 291    21B

INSTACK

EXT REFS

640    10    MN    291 291    7B

INSTACK

EXT REFS

667    190    IB    318 362    152B

INSTACK

EXT REFS

742    170    MN    339 349    40B

INSTACK

NOT INNER

756    165    IO    344 347    12B

OPT

INSTACK

1031    180    MN    359 361    4B

INSTACK

EXT REFS

1062    220    IB    387 399    30B

INSTACK

EXT REFS

1071    210    IO    395 398    14B

INSTACK

EXT REFS

1121    230    IO    40B 414    27B

INSTACK

EXT REFS

COMMON BLOCKS    LENGTH

MEMBERS - BIAS NAME(LENGTH)

O ITAPES (50)

O KFILES (1)

1 IFILES (50)

STATISTICS

PROGRAM LENGTH

CM LABELED COMMON LENGTH

52000B CM USED

21240B

8864

101

SUBROUTINE FUTSOL

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## STATEMENT LABELS

DEF LINE

REFERENCES

0	113	123	116
0	114	124	105
0	115	149	132
266	116	158	125
0	117	169	167
0	118	189	183
510	119	253	378
0	120	271	268
0	121	219	208
0	122	203	199
0	123	147	145
0	124	148	141
0	125	272	262

401	126	204	198
0	128	234	226
600	130	273	257
0	135	282	279
0	140	283	278
0	145	291	289
664	150	313	309
675	160	323	320
724	161	335	323
733	163	336	334
0	165	347	344
0	170	349	339
1022	175	358	354
0	180	361	359
1036	190	362	318
1044	195	366	363
1055	200	382	295
0	210	398	395
0	220	399	387
1136	230	414	408
1164	295	427	72
363	1118	190	182
0	9999	INACTIVE	437

## LOOPS LABEL

INDEX

FROM-TO

LENGTH

PROPERTIES

77	110	86	89	15B	EXT REFS	NOT INNER		
131	114	1	105	124	50B	EXT REFS	NOT INNER	
144	113	NPP	116	123	32B	OPT	EXT REFS	NOT INNER
156	112	NN	120	122	10B	OPT	EXT REFS	NOT INNER
207	115	I	132	149	50B	OPT	EXT REFS	NOT INNER
222	124	NPP	141	148	32B	OPT	EXT REFS	NOT INNER
234	123	NN	145	147	10B	OPT	EXT REFS	NOT INNER
312	117	NPP	167	169	20B	INSTACK	EXT REFS	NOT INNER
317	I	J	169	169	7B	INSTACK	EXT REFS	NOT INNER
341	118	I	183	189	22B	INSTACK	EXT REFS	NOT INNER
352	118	J	185	189	6B	INSTACK	EXT REFS	NOT INNER
367	122	I	199	203	12B	INSTACK	EXT REFS	NOT INNER
406	121	JCNT	208	219	36B	INSTACK	EXT REFS	NOT INNER
434	121	NPP	217	219	5B	INSTACK	EXT REFS	NOT INNER
454	128	I	226	234	23B	INSTACK	EXT REFS	NOT INNER
463	128	LREAD	230	234	12B	INSTACK	EXT REFS	NOT INNER
516	130	MN	257	273	65B	INSTACK	EXT REFS	NOT INNER
532	125	I8	262	272	46B	INSTACK	EXT REFS	NOT INNER

SUBROUTINE MACH 74/74 OPT=1 FTN 4.8+577 85/01/23. 08.10.44 PAGE 4  
 00 32 I=1,NQB MACH 173  
 32 R1(I)\*CMPLX(XR,XI) MACH 174  
 CALL COFFIN (NL,P,AM,LL,EL,KK, VBO ,NP1F) MACH 175  
 CALL TIMEB (23.23HFROM MACH, AFTER COFFIN) MACH 176  
 36 CALL GEDLAB(8HMACH O1,MTAP9,NAME,NF,IRDU,JCDU) MACH 177  
 QSAAA = NSAA(KK) MACH 178  
 REWIND MTAP12 MACH 179  
 IF ((LC(22).NE.-1) GOTO 14 MACH 180  
 CALL RIP ( NQ,OSAAA,P,ES,LC(35) ) MACH 181  
 CALL TIMEB (23.23HFROM MACH, AFTER RIP ) MACH 182  
 GO TO 60 MACH 183  
 14 CALL TRIP ( OSAAA,NQ,LINC,LC(22),NKF,P,ES,VBO,LC(35) ) MACH 184  
 REWIND MTAP14 MACH 185  
 C CALL TIME (O,O,ZRIP,4) MACH 186  
 60 IF ( LC(35) .NE. O .AND .NDB .NE. O .AND .LC(22) .NE. 1 ) MACH 187  
 1 CALL DSPDDW ( KK, NQ , VBO , LC(33) ) MACH 188  
 IF (NOPE.EQ.O) GO TO 99 MACH 189  
 REWIND MTAP12 MACH 190  
 DO 45 I = 1,NQ MACH 191  
 WRITE (ITAPEW,900) VBO MACH 192  
 LINE = 8 MACH 193  
 WRITE (ITAPEW,960) I MACH 194  
 CALL CNRW (-MTAP12,PP,NWB) MACH 195  
 DO 45 J = 1,NWB MACH 196  
 LINE = LINE + 1 MACH 197  
 IF (LINE.LT.45) GO TO 79 MACH 198  
 LINE = 10 MACH 199  
 WRITE (ITAPEW,900) VBO MACH 200  
 200 WRITE (ITAPEW,960) I MACH 201  
 79 XWIN = (XW(J) + 0.5) \* ES \* 12.0 MACH 202  
 YWIN = (YW(J) + 0.5) \* ES \* 12.0 / BETA MACH 203  
 WRITE (ITAPEW,2002) J , PP(J) , XWIN , YWIN MACH 204  
 45 CONTINUE MACH 205  
 99 CONTINUE MACH 206  
 DO 80 K = 1,NQ MACH 207  
 DO 80 KJ = 1,NQ MACH 208  
 IF (KK.EQ.1) Q(K,KJ) = 0.0 MACH 209  
 80 QS(K,KJ) = 0.0 MACH 210  
 C CALL GEDLAB(8HMACH O2,MTAP9,NAME,NF,IRDU,JCDU) MACH 211  
 DO 100 K = 1,NQ MACH 212  
 MAX=2\*NWB MACH 213  
 CALL GETROW(MTAP9, 1,DWSH,MAX) MACH 214  
 ZQ1 = QMWT(K,KK) MACH 215  
 REWIND MTAP12 MACH 216  
 DO 110 K1 = 1,NQ MACH 217  
 CALL CNRW (-MTAP12,PP,NWB) MACH 218  
 ZQ2 = QMWT(K1,KK) MACH 219  
 215 IF ( LC(33) .NE. O ) FACTOR = 1.0 / (BR\*BR) MACH 220  
 IF ( LC(33) .EQ. O ) FACTOR = VBO \* VBO MACH 221  
 DO 120 KJ = 1,NWB MACH 222  
 H = REAL (DWSH(KJ)) MACH 223  
 120 QS(K,K1) = QS(K,K1) + AW(KJ)\*PP(KJ)\*H\*ES\*ES\*EL\*O . 5\*BR\*BR MACH 224  
 1\*FACTOR\*ZQ1\*ZQ2\*QWT(KK) MACH 225  
 110 Q(K,K1) = Q(K,K1) + QS(K,K1) MACH 226  
 100 CONTINUE MACH 227  
 TF (KK NF NC) ON TO EEND MACH 228  
 229

SUBROUTINE MACH 74/74 OPT=1

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230      DO 111 K=1,NQ          (0(K,K1),K1=1,NQ)          MACH 230
      111 WRITE(MTAP50)          MACH 231
      5000 CONTINUE
      IF ( KQRS .EQ. 0 )        GO TO 51          MACH 232
      LINE = 8
      KONS = NQ/3 + NQ - 3*(NQ/3) + 1          MACH 233
      WRITE (ITAPEW,2015) AM , VBO . KK          MACH 234
      DO 88 K2=1,NQ
      LINE = LINE + KONS          MACH 235
      IF (LINE.LE.62) GO TO 88          MACH 236
      LINE = 8 + KONS          MACH 237
      WRITE (ITAPEW,2015) AM , VBO . KK          MACH 238
      88 WRITE (ITAPEW,710) (QS(K2,K3),K3=1,NQ)
      IF(NS.EQ.1) GO TO 51          MACH 239
      IF(KK.NE.NS) GO TO 51          MACH 240
      WRITE(ITAPEW,130) AM , VBO          MACH 241
      DO 225 I2=1,NQ
      225 WRITE(ITAPEW,710) (Q(I2,J1),J1=1,NQ)          MACH 242
      51 CONTINUE
      REWIND MTAP12          MACH 243
      IF (KDRAW) 450,450,350          MACH 244
      350 CALL IMAGE (NQ,KK,ES,EL,VBO,AM)          MACH 245
      CALL TIMEB (23,23HFROM MACH, AFTER IMAGE )
      450 CONTINUE
      149 CONTINUE
      150 CONTINUE
      IF (.NOT.KQINT) GO TO 19          MACH 246
      CALL QINTP (MTAP50,NO,LC(4),RVBO,NRVBO,AM,VVBO)          MACH 247
      19 CONTINUE
      C
      C FORMATS
      C
      59 FORMAT (6E10.3)
      76 FORMAT (1H1,/15X3GHBOX ELIMINATION IN FORWARD DIAPHRAGM, //)
      1 12X7HSURFACE,5X27INCHES FWD. OF LEADING EDGE //)
      78 FORMAT ((12X,13,15X,E12.4)/)
      130 FORMAT (1H1,5X44H SUM OF GENERALIZED AIRFORCES FOR MACH NO .
      1F10.3./5X5HVBO*, E10.3./15X7HBY ROWS,10X11H(REAL,IMAG), /)
      700 FORMAT (14L5)
      710 FORMAT (( T3,1PE10.3,T15,1PE10.3, T1,2H ( T13,2H,
      1   T29,1PE10.3,T41,1PE10.3,T27,2H ( T39,2H,
      2   T55,1PE10.3,T67,1PE10.3,T53,2H ( T65,2H ), T77,2H ))
      900 FORMAT (1H1,/15X28HPLANFORM PRESSURES AT VBO = . F7.3 //
      1 8X4HMODE,15X8HPRESSURE, /15X3HBOX,3X
      2 21H( REAL . IMAGINARY ),7X 6HX(IN.),7X6HY(IN.),//)
      960 FORMAT (9X,I3)
      1005 FORMAT (10I5)
      1015 FORMAT(5I5)
      2002 FORMAT (14X,14,2X,E10.3,2X,E10.3,5X,E10.3,3X,E10.3)
      2015 FORMAT (1H1,5X37HGENERALIZED AIR FORCES FOR MACH NO = .F10.3/5X
      1   6HVBO = .E12.4/5X14HSURFACE NO. = .I3./15X7HBY ROWS,10X
      2 16H(REAL,IMAGINARY).//)
      2 RETURN
      END

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SUBROUTINE MACH 74/74 OPT=1

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## SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES				
1 MACH	1	282				
VARIABLES	SN TYPE	RELOCATION				
1310 AD	REAL	ARRAY	TOMB	REFS	4	28
1630 AM	REAL	REAL	DEFINED	REFS	104	174
3424 AW	REAL	ARRAY	TOMB	REFS	67	235
0 BEL	REAL	BOXS	REFS	4	28	244
1 BETA	REAL	FLUTAN	REFS	30	224	250
0 BEX	REAL	BXL	REFS	26	102	157
50 BR	REAL	COMA	REFS	31	90	202
1 BSR	REAL	BOXS	REFS	25	167	91
0 CLEXR	REAL	BOXS	REFS	30	2*220	DEFINED
144 CLEYR	REAL	IDIOT	REFS	11	29	87
310 CTEXR	REAL	IDIOT	REFS	11	29	
454 CTEYR	REAL	IDIOT	REFS	12	29	
21156 DUMMY	REAL	IDIOT	REFS	18	DEFINED	
3232 DWSH	COMPLEX	IDIOT	REFS	7	22	
1637 EL	REAL	REAL	REFS	102	117	223
1641 ENDX	REAL	REAL	REFS	102	117	124
1643 ES	REAL	REAL	REFS	102	117	174
21140 ESR	REAL	REAL	REFS	102	121	224
1703 FACTOR	REAL	REAL	REFS	102	121	
0 FMACH	REAL	REAL	REFS	102	122	
1704 H	REAL	REAL	REFS	102	122	180
1632 I	INTEGER	REAL	REFS	183	202	165
5 IINC	INTEGER	REAL	REFS	7	2*224	DEFINED
1661 IJ	INTEGER	REAL	REFS	9	117	124
1635 IL	INTEGER	REAL	REFS	102	155	
1640 IM	* INTEGER	REAL	REFS	102	155	
2666 IND	INTEGER	REAL	REFS	102	155	
1656 IO	INTEGER	REAL	REFS	102	155	
1613 IRD	INTEGER	REAL	REFS	102	155	
1667 IRDU	INTEGER	REAL	REFS	102	155	
1645 ITAPE	INTEGER	REAL	REFS	102	155	
2 ITAPEP	INTEGER	REAL	REFS	102	155	
0 ITAPER	INTEGER	REAL	REFS	102	155	
0 ITAPES	INTEGER	REAL	REFS	102	155	
7 ITAPET	INTEGER	REAL	REFS	102	155	
1 ITAPEW	INTEGER	REAL	REFS	102	155	
1710 J2	INTEGER	CTAPES	REFS	20	33	50
1673 J	INTEGER	CTABLE	REFS	51	52	49
1614 JCD	INTEGER	CMRWP	REFS	36	53	49
1670 JCDU	INTEGER	CMRWP	REFS	34	1/O REFS	50
1711 J1	INTEGER	CMRWP	REFS	203	235	193
1634 K	INTEGER	CMRWP	REFS	34	240	246
			REFS	246	245	244
			REFS	201	202	195
			REFS	105	105	44
			REFS	176	211	44
			REFS	246	246	246
			REFS	79	87	215
			REFS	209	209	215
			REFS			3*224
			REFS			3*226

SUBROUTINE MACH			74/74	OPT=1		FTN 4.8+577	85/01/23.	OB. 10.44	PAGE	7
VARIABLES	SN	TYPE	RELOCATION							
1660 KDRAW		INTEGER				230	DEFINED	79	87	206
1642 KEND		INTEGER				REFS	249	DEFINED	151	212
1676 KJ		INTEGER				REFS	102	117	121	124
1636 KK		INTEGER				REFS	155			
1705 KONS		INTEGER				REFS	208	209	223	2*224
21133 KPLOT		INTEGER	ARRAY			REFS	102	2*104	105	110
1607 KQINT		LOGICAL				REFS	122	124	125	128
1626 KQRS		INTEGER				REFS	165	174	177	186
1605 KSURF		LOGICAL				REFS	228	235	240	243
0 KTABLE		INTEGER				REFS	237	239	240	250
5 KTABLO		INTEGER				REFS	9	9	151	234
1701 K1		INTEGER				REFS	39	96	163	255
1706 K2		INTEGER				REFS	39	163	164	255
1707 K3		INTEGER				REFS	232	DEFINED	65	DEFINED
0 LC		INTEGER	ARRAY	COMA		REFS	122	124	124	124
1612 LINC		LOGICAL				REFS	36	36	36	57
1672 LINE		INTEGER				REFS	219	2*224	230	230
1653 LL		INTEGER	ARRAY	TOMB		REFS	241	DEFINED	236	DEFINED
1275 LS		INTEGER		CTSHF		REFS	138	139	2*140	66
0 LTSHF		INTEGER		KIMA		REFS	179	180	2*183	141
0 L2		INTEGER	ARRAY			REFS	39	183	3*186	220
1677 MAX		INTEGER				REFS	196	197	197	197
1621 MTAP10	*	INTEGER				REFS	198	233	237	237
1622 MTAP11		INTEGER				REFS	170	174	239	238
1623 MTAP12		INTEGER				REFS	6	28	28	238
1624 MTAP14		INTEGER				REFS	35	32	213	238
1615 MTAP2		INTEGER				REFS	194	194	194	192
1616 MTAP3		INTEGER				REFS	214	248	248	196
1625 MTAP50		INTEGER				REFS	50	50	51	192
1617 MTAP8		INTEGER				REFS	122	122	122	192
1620 MTAP9		INTEGER				REFS	46	46	47	192
21152 NAME		INTEGER	ARRAY	ARRAY		REFS	47	47	47	192
21154 NAMSRF		INTEGER				REFS	161	161	161	192
1610 NBEL		LOGICAL				REFS	256	256	256	192
620 NCCLR		INTEGER				REFS	113	113	113	192
3 NCOLS		INTEGER				REFS	105	112	112	192
4 NCOLST		INTEGER				REFS	49	49	49	192
1644 NCS		INTEGER				REFS	17	17	17	192
21145 NCSS		INTEGER	ARRAY	ARRAY		REFS	17	105	105	192
625 NCTER		INTEGER				REFS	39	86	86	192
1274 NDB		INTEGER				REFS	10	29	29	192
3225 NDI		INTEGER	ARRAY	IDIOT		REFS	36	36	36	192
1657 NF		INTEGER		CTABLE		REFS	111	121	124	192
1655 NKF		INTEGER		CTABLE		REFS	10	110	110	192
						REFS	28	128	158	159
						REFS	154	155	155	192
						REFS	7	154	154	192
						REFS	152	176	211	128
						REFS	150	183	183	128
						REFS		145	145	152

ROUTINE	MACH	74/74	OPT = 1	RELOCATION	FTN 4.8+577	85/01/23. 08.10.44	PAGE
VARIABLES							8
1652 NL	INTEGER				2*170	174	DEFINED
1666 NOB	INTEGER				172	170	DEFINED
1627 NOPE	INTEGER				188	66	DEFINED
6 NPAGEA	INTEGER				REFS	36	
1 NPASS	INTEGER				REFS	36	
1633 NPIF	INTEGER				REFS	174	DEFINED
1646 NPOINT	INTEGER				REFS	117	122
1611 NPTF	* LOGICAL				REFS	117	121
1631 NQ	INTEGER				REFS	190	206
					REFS	186	207
					REFS	236	241
					3*234	245	246
					DEFINED	72	
					REFS	146	DEFINED
					REFS	36	REFINED
					REFS	26	141
					REFS	29	73
					REFS	87	93
					243	177	
					REFS	9	
					REFS	28	127
					REFS	222	153
					REFS	7	153
					REFS	180	183
					REFS	174	180
					REFS	5	22
					REFS	8	22
					DEFINED	208	226
					REFS	14	24
					REFS	8	22
					DEFINED	209	224
					REFS	14	24
					REFS	117	122
					REFS	15	26
					REFS	5	22
					REFS	19	35
					REFS	167	174
					REFS	235	240
					REFS	15	26
					REFS	39	117
					REFS	3	28
					REFS	6	102
					REFS	132	134
					DEFINED	5	28
					REFS	173	DEFINED
					REFS	4	28
					REFS	6	102
					REFS	3	28
					REFS	203	DEFINED
					REFS	3	28
					DEFINED	169	DEFINED
					REFS	4	28
					REFS	6	102
					REFS	133	134
					REFS	3	28
					REFS	203	DEFINED
					REFS	201	DEFINED
					REFS	168	160
					REFS	6	133
					REFS	135	130
					REFS	3	28
					REFS	202	DEFINED
					REFS	224	215
					REFS	224	DEFINED
					REFS	224	DEFINED
					REFS	224	DEFINED

~~REAL~~ VARIABLES USED AS FILE NAMES, SEE ABOVE

SUBROUTINE MACH				74/74	OPT=1	FTN 4.8+577	85/01/23. 08.10.44	PAGE 9
EXTERNALS		TYPE	ARGS	REFERENCES				
CNRW			3	194	218			
COFFIN			8	174				
DSPDOW			4	186				
DSPMD			2	125				
EVOVLE			10	102				
GEDLAB			6	176	211			
GETROW			4	214				
HEL2			7	121	124			
IMAGE			6	250				
MODAZ			10	117	122			
PLAN			3	104				
PTABLE			3	58	61			
PUDLAB			6	105				
QINTP			7	256				
RIP			5	180				
TIMEB			2	77				
TRIP			9	183				
INLINE FUNCTIONS				ARGS	DEF LINE	REFERENCES		
AMAX1	REAL		0	INTRIN	132			
CMPXL	COMPLEX		2	INTRIN	173			
REAL	REAL		1	INTRIN	223			
STATEMENT LABELS				DEF LINE	REFERENCES			
0	2	INACTIVE	127					
0	10	INACTIVE	129					
432	14	INACTIVE	183	179				
0	15		133	131				
766	19		257	255				
0	30	INACTIVE	134					
0	32		173	172				
416	36		176	171				
0	40		74	73				
300	42		144	139	142			
277	43		143	140				
0	45		204	190	195			
747	51		247	232	242			
151	57		98	93	96			
1446	59	FMT	262	87				
436	60		186	182				
137	67		93	86				
1450	76	FMT	263	88				
134	77		92	89	90			
1463	78	FMT	265	91				
472	79		201	197				
0	80		209	206	207			
0	81		81	80				
110	83		84	82				
0	84		85	84				
701	88		241	236	238			
512	99		205	188				
0	100		227	212				
0	110		226	217				
0	111		230	229				
0	120		224	222				
1466	130	FMT	266	244				

O 149		253	149
O 150		254	146
O 225		246	245
O 300		128	101
O 350		250	249
O 401		157	156
O 402		160	159
350 420	FMT	161	158
756 450	FMT	252	2*249
1502 700	FMT	268	75
1504 710	FMT	269	241
O 888	INACTIVE	156	246
1524 900	FMT	272	191
1542 960	FMT	275	193
1544 1005	FMT	276	76
1546 1015	FMT	277	83
1550 2002	FMT	278	203
1555 2015	FMT	279	235
661 5000		231	228

FROM-TO	LENGTH	PROPERTIES
50 40 I	73 74	INSTACK
77 81 IL	80 81	INSTACK
113 84 IL	84 85	INSTACK
127 77 I	89 92	INSTACK
140 57 I	93 98	EXT REFS
156 300 KK	101 128	EXT REFS
246 15 I	131 133	68
302 150 IO	146 254	4618
306 149 KK	149 253	4538
320 401 IJ	156 157	148
336 402 IJ	159 160	128
406 32 I	172 173	48
451 45 I	190 204	418
462 45 J	195 204	268
513 80 K	206 209	218
524 80 KJ	207 209	4B
536 100 K	212 227	100B
550 110 K1	217 226	64B
606 120 KJ	222 224	14B
641 111 K	229 230	20B
644 111 K1	230 230	11B
673 88 K2	236 241	26B
704 225 K3	241 241	11B
727 225 I2	245 246	20B
732	J1	246 246

FLUTQ	205	O QMWT (200)	200 QWT (5)
COMA	41	O LC (40)	40 BR (1)
FLUTAN	48	O FMACH (1)	1 BETA (1)
		32 RVBO (15)	47 NRVBO (1)
CORPSE	4000	O R1 (4000)	
TOMB	2162	O XW (350)	350 YW (350)
		701 LS (5)	706 XMAX (5)
		712 AD (250)	962 XD (250)
		1462 IND (350)	1812 AW (350)

2 VVBO (30)
700 NDB (1)
711 NWB (1)
1212 YD (250)

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME( LENGTH)				
IDIOT	411	O CLEXR (100) 300 CTEYR (100) 410 NS (1)	100 CLEYR (100) 400 NCLER (5)	200 CTEXR (100) 405 NCTER (5)		
BOXS	2	O BEL (1)	1 BSR (1)			
BXLL	5	O BEX (5)				
KIMA	10	O LZ (5)	5 IINC (5)			
CTAPES	50	O ITAPES (50)				
COMRP	3	O ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)		
CTSHF	2	O LTSHF (1)	1 TSHF (1)			
CTABLE	8	O KTABLE (1)	1 NPASS (1)	2 NRROWS (1)		
		3 NCOLS (1)	4 NCOLST (1)	5 KTABLO (1)		
		6 NPAGEA (1)	7 ITAPET (1)			

## STATISTICS

PROGRAM LENGTH	21313B	8907
CM LABELED COMMON LENGTH	15443B	6947
52000B CM USED		

**END**

**FILMED**

**5-85**

**DTIC**